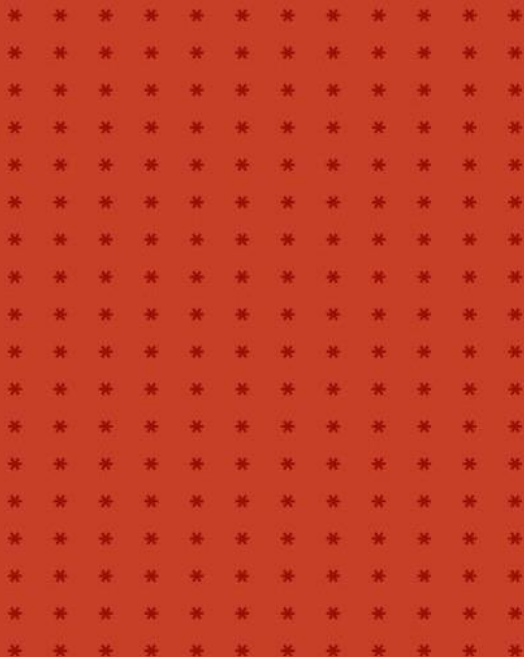


Academic Regulations 2022

MBBS

Ramaiah Medical College
NAAC Accreditation A+
NABL Accredited
NABH Accredited

Ramaiah University of Applied Sciences
University House, New BEL Road,
MSR Nagar, Bangalore –560054.
www.msruas.ac.in





Academic Regulations

MBBS Program

M. S. Ramaiah Medical College

Batch 2022-2023 Onwards

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Academic Regulations for MBBS Program

(Applicable for batches commencing from 2022-2023)

U 1. Short Title and Commencement

- a. The regulations listed under this head are for Bachelor of Medicine and Bachelor of Surgery (MBBS) Program offered by the University.
- b. The regulations here under are subject to amendments by the Academic Council of the Ramaiah University of Applied Sciences from time to time, after obtaining approval of the Board of Management. Such amendments will be effective from such date and apply to such batches of candidates, including those already undergoing the Program, or as may be determined by the Academic Council and regulations framed by National Medical Commission.

U 2. Definitions

- i. "Commission" means National Medical Commission (NMC)
- ii. "Program" means academic schedule a student is required to successfully complete to become eligible for the award of MBBS Degree.
- iii. "Department" means an academic unit, under the Ramaiah Medical College, responsible for delivering a particular Course in MBBS.
- iv. "Faculty" means the teaching faculty of Ramaiah Medical College
- v. "GOI" means Government of India
- vi. "KEA" means Karnataka Examination Authority
- vii. "NEET" means National Eligibility Cum Entrance Test
- viii. "NEXT" mean National Exit Test
- ix. "Statute" means the M. S. Ramaiah University of Applied Sciences Statutes
- x. "University" means the M. S. Ramaiah University of Applied Sciences (MSRUAS)

U 3. Academic Program

U 3.1 Nomenclature of the Program

The nomenclature and the abbreviation given below shall be used for this Program of the University:

- (i) Bachelor of Medicine & Bachelor of Surgery (MBBS)

U 3.2 Medium of Instruction

The medium of instruction for the Program is English

U 3.3 Program Offered

The University offers Bachelor of Medicine & Bachelor of Surgery (MBBS) Degree Program

U 3.4 Academic Year

The academic calendar will be synchronized with the admission notification and allotment of candidates by the Government of Karnataka in each academic year. The academic year will be as per the recommendations by NMC with amendments issued from time to time.

U 4. Program Duration

U 4.1. Normal Duration

The normal duration of the Program is five years and 6 months including one year of Compulsory Rotatory Residential Internship (CRRI)

U 5. Admissions

U 5.1 Admission of Students

Admission of students to MBBS Program shall be made by the University based on counselling conducted by KEA in accordance with the rules and regulations framed by National Medical Commission/Government of Karnataka with amendments issued from time to time.

U 5.2 Eligibility:

Eligibility for admission to MBBS program is as per the instructions issued by National Medical Commission/Karnataka Examination Authority/Government of Karnataka with amendments issued time to time.

U 5.3 Selection of Students

Selection of the students is done through counselling conducted as per the rules and regulations of Karnataka Examination Authority/Government of Karnataka with amendments issued from time to time.

U 5.4. Admission to Program

The candidates shall complete the admission procedure within the prescribed date by paying the prescribed fees and completing all other admission formalities notified by the Karnataka Education Authority (KEA) and M. S. Ramaiah University of Applied Sciences. Failure to do so may lead to cancellation of the selection.

U 5.5. Annual Program Fees

Details of the fees payable for the Program will be notified well in advance to the commencement of the Program.

The fees, once paid, will not be refunded under any circumstances.

The continuation of a student in subsequent academic years is subject to payment of the prescribed Program fees and other fees for each of those years.

GENERAL CONSIDERATIONS AND TEACHING APPROACH

U 6. Indian Medical Graduate Training Programme

The undergraduate medical education programme is designed with a goal to create an “Indian Medical Graduate” (IMG) possessing requisite knowledge, skills, attitudes, values and responsiveness, so that she or he may function appropriately and effectively as a physician of first contact of the community while being globally relevant. To achieve this, the following national and institutional goals for the learner of the Indian Medical Graduate training programme are hereby prescribed:-

U 6.1. National Goals

At the end of undergraduate program, the Indian Medical Graduate should be able to:

- (a) Recognize “health for all” as a national goal and health right of all citizens and by undergoing training for medical profession to fulfill his/her social obligations towards realization of this goal.
- (b) Learn every aspect of National policies on health and devote her/him to its practical implementation.
- (c) Achieve competence in practice of holistic medicine, encompassing promotive, preventive, curative and rehabilitative aspects of common diseases.
- (d) Develop scientific temper, acquire educational experience for proficiency in profession and promote healthy living.
- (e) Become exemplary citizen by observance of medical ethics and fulfilling social and professional obligations, so as to respond to national aspirations.

U 6.2. Institutional Goals

- (1) In consonance with the national goals each medical institution should evolve institutional goals to define the kind of trained manpower (or professionals) they intend to produce. The Indian Medical Graduates coming out of a medical institute should:
 - (a) be competent in diagnosis and management of common health problems of the individual and the community, commensurate with his/her position as a member of the health team at the primary, secondary or tertiary levels, using his/her clinical skills based on history, physical examination and relevant investigations.
 - (b) be competent to practice preventive, promotive, curative, palliative and rehabilitative medicine in respect to the commonly encountered health problems.
 - (c) appreciate rationale for different therapeutic modalities; be familiar with the administration of “essential medicines” and their common adverse effects.
 - (d) be able to appreciate the socio-psychological, cultural, economic and environmental factors affecting health and develop humane attitude towards the patients in discharging one's professional responsibilities.
 - (e) possess the attitude for continued self-learning and to seek further expertise or to pursue research in any chosen area of medicine, action research and documentation skills.

(f) be familiar with the basic factors which are essential for the implementation of the National Health Programmes including practical aspects of the following:

- (i) Family Welfare and Maternal and Child Health (MCH)
- (ii) Sanitation and water supply
- (iii) Prevention and control of communicable and non-communicable diseases
- (iv) Immunization
- (v) Health Education
- (vi) Indian Public Health Standards (IPHS), at various levels of service delivery
- (vii) Bio-medical waste disposal
- (viii) Organizational and/or institutional arrangements.

(g) acquire basic management skills in the area of human resources, materials and resource management related to health care delivery, hospital management, inventory skills and counseling.

(h) be able to identify community health problems and learn to work to resolve these by designing, instituting corrective steps and evaluating outcome of such measures.

(i) be able to work as a leading partner in health care teams and acquire proficiency in communication skills.

(j) be competent to work in a variety of health care settings.

(k) have personal characteristics and attitudes required for professional life such as personal integrity, sense of responsibility and dependability and ability to relate to or show concern for other individuals.

(2) All efforts must be made to equip the medical graduate to acquire the skills as detailed in Table 11
Certifiable procedural skills – A Comprehensive list of skills recommended as desirable for Bachelor of Medicine and Bachelor of Surgery (MBBS) – Indian Medical Graduate.

U 6.3. Goals and Roles for the Learner

In order to fulfil the goal of the IMG training programme, the medical graduate must be able to function in the

following roles appropriately and effectively:-

(a) Clinician who understands and provides preventive, promotive, curative, palliative and holistic care with compassion.

(b) Leader and member of the health care team and system with capabilities to collect analyze, synthesize and communicate health data appropriately.

(c) Communicator with patients, families, colleagues and community.

(d) Lifelong learner committed to continuous improvement of skills and knowledge.

(e) Professional, who is committed to excellence, is ethical, responsive and accountable to patients, community and profession.

U 7. Competency Based Training Programme of the Indian Medical Graduate

Competency based learning would include designing and implementing medical education curriculum that focuses on the desired and observable ability in real life situations. In order to effectively fulfil the roles as listed in clause 2, the Indian Medical Graduate would have obtained the following set of competencies at the time of graduation:

U 7.1. Clinician, who understands and provides preventive, promotive, curative, palliative and holistic care with Compassion

U 7.1.1 Demonstrate knowledge of normal human structure, function and development from a molecular, cellular, biologic, clinical, behavioural and social perspective.

U 7.1.2. Demonstrate knowledge of abnormal human structure, function and development from a molecular, cellular, biological, clinical, behavioural and social perspective.

U 7.1.3. Demonstrate knowledge of medico-legal, societal, ethical and humanitarian principles that influence health care.

U 7.1.4 Demonstrate knowledge of national and regional health care policies including the National Health Mission that incorporates National Rural Health Mission (NRHM) and National Urban Health Mission (NUHM), frameworks, economics and systems that influence health promotion, health care delivery, disease prevention, effectiveness, responsiveness, quality and patient safety.

U 7.1.5. Demonstrate ability to elicit and record from the patient, and other relevant sources including relatives and caregivers, a history that is complete and relevant to disease identification, disease prevention and health promotion.

U 7.1.6. Demonstrate ability to elicit and record from the patient, and other relevant sources including relatives and caregivers, a history that is contextual to gender, age, vulnerability, social and economic status, patient preferences, beliefs and values.

U 7.1.7 Demonstrate ability to perform a physical examination that is complete and relevant to disease identification, disease prevention and health promotion.

U 7.1.8 Demonstrate ability to perform a physical examination that is contextual to gender, social and economic status, patient preferences and values.

U 7.1.9 Demonstrate effective clinical problem solving, judgment and ability to interpret and integrate available data in order to address patient problems, generate differential diagnoses and develop individualized management plans that include preventive, promotive and therapeutic goals.

U 7.1.10 Maintain accurate, clear and appropriate record of the patient in conformation with legal and administrative frame works.

U 7.1.11 Demonstrate ability to choose the appropriate diagnostic tests and interpret these tests based on scientific validity, cost effectiveness and clinical context.

U 7.1.12 Demonstrate ability to prescribe and safely administer appropriate therapies including nutritional interventions, pharmacotherapy and interventions based on the principles of rational drug therapy, scientific validity, evidence and cost that conform to established national and regional health programmes and policies for the following:

- (i) Disease prevention,
- (ii) Health promotion and cure,
- (iii) Pain and distress alleviation, and
- (iv) Rehabilitation.

U 7.1.13 Demonstrate ability to provide a continuum of care at the primary and/or secondary level that addresses chronicity, mental and physical disability.

U 7.1.14 Demonstrate ability to appropriately identify and refer patients who may require specialized or advanced tertiary care.

U 7.1.15 Demonstrate familiarity with basic, clinical and translational research as it applies to the care of the patient.

U 7.2. Leader and member of the health care team and system

U 7.2.1 Work effectively and appropriately with colleagues in an inter-professional health care team respecting diversity of roles, responsibilities and competencies of other professionals.

U 7.2.2 Recognize and function effectively, responsibly and appropriately as a health care team leader in primary and secondary health care settings.

U 7.2.3 Educate and motivate other members of the team and work in a collaborative and collegial fashion that will help maximize the health care delivery potential of the team.

U 7.2.4 Access and utilize components of the health care system and health delivery in a manner that is appropriate, cost effective, fair and in compliance with the national health care priorities and policies, as well as be able to collect, analyze and utilize health data.

U 7.2.5 Participate appropriately and effectively in measures that will advance quality of health care and patient safety within the health care system.

U 7.2.6 Recognize and advocate health promotion, disease prevention and health care quality improvement through prevention and early recognition: in a) life style diseases and b) cancers, in collaboration with other members of the health care team.

U 7.3. Communicator with patients, families, colleagues and community

U 7.3.1 Demonstrate ability to communicate adequately, sensitively, effectively and respectfully with patients in a language that the patient understands and in a manner that will improve patient satisfaction and health care outcomes.

U 7.3.2 Demonstrate ability to establish professional relationships with patients and families that are positive, understanding, humane, ethical, empathetic, and trustworthy.

U 7.3.3 Demonstrate ability to communicate with patients in a manner respectful of patient's preferences, values, prior experience, beliefs, confidentiality and privacy.

U 7.3.4 Demonstrate ability to communicate with patients, colleagues and families in a manner that encourages participation and shared decision-making.

U 7.4. Lifelong learner committed to continuous improvement of skills and knowledge

U 7.4.1. Demonstrate ability to perform an objective self-assessment of knowledge and skills, continue learning, refine existing skills and acquire new skills.

U 7.4.2. Demonstrate ability to apply newly gained knowledge or skills to the care of the patient.

U 7.4.3. Demonstrate ability to introspect and utilize experiences, to enhance personal and professional growth and learning.

U 7.4.4. Demonstrate ability to search (including through electronic means), and critically evaluate the medical literature and apply the information in the care of the patient.

U 7.4.5. Be able to identify and select an appropriate career pathway that is professionally rewarding and personally fulfilling.

U 7.5. Professional who is committed to excellence, is ethical, responsive and accountable to patients, community and the profession

U 7.5.1. Practice selflessness, integrity, responsibility, accountability and respect.

U 7.5.2. Respect and maintain professional boundaries between patients, colleagues and society.

U 7.5.3. Demonstrate ability to recognize and manage ethical and professional conflicts.

U 7.5.4. Abide by prescribed ethical and legal codes of conduct and practice.

U 7.5.5. Demonstrate a commitment to the growth of the medical profession as a whole.

U 8. Broad Outline on training format

U 8.1. In order to ensure that training is in alignment with the goals and competencies listed in sub-clause 2 and 3 above:

U 8.1.1 There shall be a "Foundation Course" to orient medical learners to MBBS programme, and provide them with requisite knowledge, communication (including electronic), technical and language skills.

U 8.1.2 The curricular contents shall be vertically and horizontally aligned and integrated to the maximum extent possible in order to enhance learner's interest and eliminate redundancy and overlap.

U 8.1.3. Teaching-learning methods shall be learner centric and shall predominantly include small group learning, interactive teaching methods and case based learning.

U 8.1.4. Clinical training shall emphasize early clinical exposure, skill acquisition, certification in essential skills; community/primary/secondary care-based learning experiences and emergencies.

U 8.1.5. Training shall primarily focus on preventive and community based approaches to health and disease, with specific emphasis on national health priorities such as family welfare, communicable and non-communicable diseases including cancer, epidemics and disaster management.

U 8.1.6. Acquisition and certification of skills shall be through experiences in patient care, diagnostic and skill laboratories.

U 8.1.7. The development of ethical values and overall professional growth as integral part of curriculum shall be emphasized through a structured longitudinal and dedicated programme on professional development including attitude, ethics and communication.

U 8.1.8. Progress of the medical learner shall be documented through structured periodic assessment that includes formative and summative assessments. Logs of skill-based training shall be also maintained.

U 8.2. Appropriate Faculty Development Programmes shall be conducted regularly by institutions to facilitate medical teachers at all levels to continuously update their professional and teaching skills, and align their teaching skills to curricular objectives.

PHASE WISE TRAINING AND TIME DISTRIBUTION FOR PROFESSIONAL DEVELOPMENT

The Competency based Undergraduate Curriculum and Attitude, Ethics and Communication (AETCOM) course, as published by the Medical Council of India and also made available on the Council's website, shall be the curriculum for the batches admitted in MBBS from the academic year 2019-20 onwards.

Provided that in respect of batches admitted prior to the academic year 2019-20, the governing provisions shall remain as contained in the Part I of these Regulations.

U 9. Training period and time distribution:

U 9.1. Every learner shall undergo a period of certified study extending over 4 ½ academic years, divided into nine semesters from the date of commencement of course to the date of completion of examination which shall be followed by one year of compulsory rotating internship.

U 9.2. Each academic year will have at least 240 teaching days with a minimum of eight hours of working on each day including one hour as lunch break.

U 9.3. Teaching and learning shall be aligned and integrated across specialties both vertically and horizontally for better learner comprehension. Learner centered learning methods should include problem oriented learning, case studies, community oriented learning, self- directed and experiential learning.

U 9.4. The period of 4 ½ years is divided as follows:

U 9.4.1. Pre-Clinical Phase [(Phase I) - First Professional phase of 13 months preceded by Foundation Course of one month]: will consist of preclinical subjects – Human Anatomy, Physiology, Biochemistry, Introduction to Community Medicine, Humanities, Professional development including Attitude, Ethics & Communication (AETCOM) module and early clinical exposure, ensuring both horizontal and vertical integration.

U 9.4.2. Para-clinical phase [(Phase II) - Second Professional (12 months)]: will consist of Para-clinical subjects namely Pathology, Pharmacology, Microbiology, Community Medicine, Forensic Medicine and Toxicology, Professional development including Attitude, Ethics & Communication (AETCOM) module and introduction to clinical subjects ensuring both horizontal and vertical integration.

The clinical exposure to learners will be in the form of learner-doctor method of clinical training in all phases. The emphasis will be on primary, preventive and comprehensive health care. A part of training during clinical postings should take place at the *primary level* of health care. It is desirable to provide learning experiences in secondary health care, wherever possible. This will involve:

- (a) Experience in recognizing and managing common problems seen in outpatient, inpatient and emergency settings,
- (b) Involvement in patient care as a team member,
- (c) Involvement in patient management and performance of basic procedures.

U 9.4.3. Clinical Phase – [(Phase III) Third Professional (28 months)]

(a) Part I (13 months) - The clinical subjects include General Medicine, General Surgery, Obstetrics & Gynaecology, Pediatrics, Orthopaedics, Dermatology, Otorhinolaryngology, Ophthalmology, Community Medicine, Forensic Medicine and Toxicology, Psychiatry, Respiratory Medicine, Radiodiagnosis & Radiotherapy and Anaesthesiology & Professional development including AETCOM module.

(b) Electives (2 months) - To provide learners with opportunity for diverse learning experiences, to do research/community projects that will stimulate enquiry, self-directed experimental learning and lateral thinking [9.3].

(c) Part II (13 months) - Clinical subjects include:

- i. Medicine and allied specialties (General Medicine, Psychiatry, Dermatology Venereology and Leprosy (DVL), Respiratory Medicine including Tuberculosis)
- ii. Surgery and allied specialties (General Surgery, Orthopedics [including trauma]), Dentistry, Physical Medicine and rehabilitation, Anaesthesiology and Radiodiagnosis)
- iii. Obstetrics and Gynecology (including Family Welfare)

- iv. Pediatrics
- v. AETCOM module

U 9.5. Didactic lectures shall not exceed one third of the schedule; two third of the schedule shall include interactive sessions, practicals, clinical or/and group discussions. The learning process should include clinical experiences, problem oriented approach, case studies and community health care activities.

The admission shall be made strictly in accordance with the statutory notified time schedule towards the same.

U 9.6. Universities shall organize admission timing and admission process in such a way that teaching in the first Professional year commences with induction through the Foundation Course by the 1st of August of each year.

(i) Supplementary examinations shall not be conducted later than 90 days from the date of declaration of the results of the main examination, so that the learners who pass can join the main batch for progression and the remainder would appear for the examination in the subsequent year.

(ii) A learner shall not be entitled to graduate later than ten (10) years of her/his joining the first MBBS course.

U 9.7. No more than four attempts shall be allowed for a candidate to pass the first Professional examination. The total period for successful completion of first Professional course shall not exceed four (4) years. Partial attendance of examination in any subject shall be counted as an attempt.

U 9.8. A learner, who fails in the second Professional examination, shall not be allowed to appear in third Professional Part I examination unless she/he passes all subjects of second Professional examination.

U 9.9. Passing in third Professional (Part I) examination is not compulsory before starting part II training; however, passing of third Professional (Part I) is compulsory for being eligible for third Professional (Part II) examination.

U 9.10. During para-clinical and clinical phases, including prescribed 2 months of electives, clinical postings of three hours duration daily as specified in Tables 5, 6, 7 and 8 would apply for various departments.

U 10. Phase distribution and timing of examination

U 10.1. Time distribution of the MBBS programme is given in Table 1.

U 10.2. Distribution of subjects by Professional Phase-wise is given in Table 2.

U 10.3. Minimum teaching hours prescribed in various disciplines are as under Tables 3-7.

U 10.4. Distribution of clinical postings is given in Table 8.

U 10.5. Duration of clinical postings will be:

U 10.5.1. Second Professional: 36 weeks of clinical posting (Three hours per day - five days per week: Total 540hours)

U 10.5.2. Third Professional part I: 42 weeks of clinical posting (Three hours per day - six days per week: Total 756 hours)

U 10.5.3. Third Professional part II: 44 weeks of clinical posting (Three hours per day - six days per week: Total 792 hours)

U 10.6. Time allotted excludes time reserved for internal / University examinations, and vacation.

U 10.7. Second professional clinical postings shall commence before / after declaration of results of the first professional phase examinations, as decided by the institution/ University. Third Professional parts I and part II clinical postings shall start no later than two weeks after the completion of the previous professional examination.

U 10.8. 25% of allotted time of third Professional shall be utilized for integrated learning with pre- and para- clinical subjects. This will be included in the assessment of clinical subjects.

Table 1: Time distribution of MBBS Programme & Examination Schedule

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
							Foundation Course	I MBBS			
I MBBS								Exam I MBBS	II MBBS		
II MBBS								Exam II MBBS	III MBBS		
III MBBS Part I									Exam III MBBS Part I	Electives & Skills	
III MBBS Part II											
Exam III MBBS Part II		Internship									
Internship											

One month is provided at the end of every professional year for completion of examination and declaration of results.

Table 2: Distribution of subjects by Professional Phase

Phase & year of MBBS training	Subjects & New Teaching Elements	Duration#	University examination
First Professional MBBS	- Foundation Course (1 month) - Human Anatomy, Physiology & Biochemistry, introduction to Community Medicine, Humanities - Early Clinical Exposure	1 + 13 months	I Professional

	Attitude, Ethics, and Communication Module (AETCOM)		
Second Professional MBBS	- Pathology, Microbiology, Pharmacology, Forensic Medicine and Toxicology, - Introduction to clinical subjects including Community Medicine - Clinical postings - Attitude, Ethics & Communication Module (AETCOM)	12 months	II Professional
Third Professional MBBS Part I	- General Medicine, General Surgery, Obstetrics & Gynecology, Pediatrics, Orthopedics, Dermatology, Psychiatry, Otorhinolaryngology, Ophthalmology, Community Medicine, Forensic Medicine and Toxicology, Respiratory medicine, Radiodiagnosis & Radiotherapy, Anesthesiology - Clinical subjects /postings - Attitude, Ethics & Communication Module (AETCOM)	13 months	III Professional (Part I)
Electives	Electives, Skills and assessment*	2 months	
Third Professional MBBS Part II	- General Medicine, Pediatrics, General Surgery, Orthopedics, Obstetrics and Gynecology including Family welfare and allied specialties - Clinical postings/subjects - Attitude, Ethics & Communication Module (AETCOM)	13 months	III Professional (Part II)

*Assessment of electives shall be included in Internal Assessment.

Table 3: Foundation Course (one month)

Subjects/ Contents	Teaching hours	Self Directed Learning (hours)	Total hours
Orientation ¹	30	0	30
Skills Module ²	35	0	35
Field visit to Community Health Center	8	0	8
Introduction to Professional Development & AETCOM module	-	-	40
Sports and extracurricular activities	22	0	22
Enhancement of language/ computer skills ³	40	0	40
	-	-	175

1. Orientation course will be completed as single block in the first week and will contain elements outlined in 9.1.

2. Skills modules will contain elements outlined in 9.1.

3. Based on perceived need of learners, one may choose language enhancement (English or local spoken or both) and computer skills. This should be provided longitudinally through the duration of the Foundation Course.

Teaching of Foundation Course will be organized by pre-clinical departments.

Table 4: First Professional teaching hours

Subjects	Lectures (hours)	Small Group Teaching/ Tutorials/ Integrated learning/ Practical (hours)	Self directed learning (hours)	Total (hours)
Human Anatomy	220	415	40	675
Physiology*	160	310	25	495
Biochemistry	80	150	20	250
Early Clinical Exposure**	90	-	0	90
Community Medicine	20	27	5	52
Attitude, Ethics & Communication Module (AETCOM) ***	-	26	8	34
Sports and extracurricular activities	-	-	-	60
Formative assessment and Term examinations	-	-	-	80
Total	-	-	-	1736

* including Molecular Biology.

** Early clinical exposure hours to be divided equally in all three subjects.

*** AETCOM module shall be a longitudinal programme.

Table 5: Second Professional teaching hours

Subjects	Lectures (hours)	Small group learning (Tutorials / Seminars) /Integrated learning (hours)	Clinical Postings (hours) *	Self - Directed Learning (hours)	Total (hours)
Pathology	80	138	-	12	230
Pharmacology	80	138	-	12	230
Microbiology	70	110	-	10	190
Community Medicine	20	30	-	10	60
Forensic Medicine and Toxicology	15	30	-	5	50
Clinical Subjects	75**	-	540***		615
Attitude, Ethics & Communication Module (AETCOM)		29	-	8	37
Sports and extracurricular activities	-	-	-	28	28
Total	-	-	-	-	1440

* At least 3 hours of clinical instruction each week must be allotted to training in clinical and procedural skill

laboratories. Hours may be distributed weekly or as a block in each posting based on institutional logistics.

** 25 hours each for Medicine, Surgery and Gynecology & Obstetrics.

***The clinical postings in the second professional shall be 15 hours per week (3 hrs per day from Monday to Friday).

Table 6: Third Professional Part I teaching hours

Subjects	Teaching Hours	Tutorials/ Seminars /Integrated Teaching (hours)	Self- Directed Learning (hours)	Total (hours)
General Medicine	25	35	5	65
General Surgery	25	35	5	65
Obstetrics and Gynecology	25	35	5	65
Pediatrics	20	30	5	55
Orthopaedics	15	20	5	40
Forensic Medicine and Toxicology	25	45	5	75
Community Medicine	40	60	5	105
Dermatology	20	5	5	30
Psychiatry	25	10	5	40
Respiratory Medicine	10	8	2	20
Otorhinolaryngology	25	40	5	70
Ophthalmology	30	60	10	100
Radiodiagnosis and Radiotherapy	10	8	2	20
Anesthesiology	8	10	2	20
Clinical Postings*	-	-	-	756
Attitude, Ethics & Communication Module (AETCOM)		19	06	25
Total	303	401	66	1551

* The clinical postings in the third professional part I shall be 18 hours per week (3 hrs per day from Monday to Saturday).

Table 7: Third Professional Part II teaching hours

Subjects	Teaching Hours	Tutorials/Seminars / Integrated Teaching (hours)	Self - Directed Learning (hours)	Total* (hours)
General Medicine	70	125	15	210
General Surgery	70	125	15	210
Obstetrics and Gynecology	70	125	15	210
Pediatrics	20	35	10	65
Orthopaedics	20	25	5	50
Clinical Postings**				792
Attitude, Ethics & Communication Module (AETCOM)***	28		16	43
Electives				200
Total	250	435	60	1780

* 25% of allotted time of third professional shall be utilized for integrated learning with pre- and para-clinical subjects and shall be assessed during the clinical subjects examination. This allotted time will be utilized as integrated teaching by para-clinical subjects with clinical subjects (as Clinical Pathology, Clinical Pharmacology and Clinical Microbiology).

** The clinical postings in the third professional part II shall be 18 hours per week (3 hrs per day from Monday to Saturday).

*** Hours from clinical postings can also be used for AETCOM modules.

Table 8: Clinical postings

Subjects	Period of training in weeks			Total weeks
	II MBBS	III MBBS Part I	III MBBS Part II	
Electives	-	-	8* (4 regular clinical posting)	4
General Medicine ¹	4	4	8+4	20
General Surgery	4	4	8+4	20
Obstetrics & Gynaecology ²	4	4	8 + 4	20
Pediatrics	2	4	4	10
Community Medicine	4	6	-	10
Orthopedics - including Trauma ³	2	4	2	8
Otorhinolaryngology	4	4	-	8
Ophthalmology	4	4	-	8
Respiratory Medicine	2	-	-	2
Psychiatry	2	2	-	4
Radiodiagnosis ⁴	2	-	-	2
Dermatology, Venereology & Leprosy	2	2	2	6
Dentistry & Anesthesia	-	2	-	2
Casualty	-	2	-	2
	36	42	48	126

* In four of the eight weeks of electives, regular clinical postings shall be accommodated.

Clinical postings may be adjusted within the time framework.

This posting includes Laboratory Medicine (Para-clinical) & Infectious Diseases (Phase III Part I).

This includes maternity training and family welfare (including Family Planning).

This posting includes Physical Medicine and Rehabilitation.

This posting includes Radiotherapy, wherever available.

U 11. New teaching / learning elements

U 11.1. Foundation Course

U 11.1.1 **Goal:** The goal of the Foundation Course is to prepare a learner to study medicine effectively. It will be of one-month duration after admission.

U 11.1.2 **Objectives:** The objectives are to:

(a) Orient the learner to:

- (i) The medical profession and the physician's role in society
- (ii) The MBBS programme
- (iii) Alternate health systems in the country and history of medicine
- (iv) Medical ethics, attitudes and professionalism
- (v) Health care system and its delivery
- (vi) National health programmes and policies
- (vii) Universal precautions and vaccinations

- (viii) Patient safety and biohazard safety
- (ix) Principles of primary care (general and community based care)
- (x) The academic ambience

(b) Enable the learner to acquire enhanced skills in:

- (i) Language
- (ii) Interpersonal relationships
- (iii) Communication
- (iv) Learning including self-directed learning
- (v) Time management
- (vi) Stress management
- (vii) Use of information technology

(c) Train the learner to provide:

- (i) First-aid
- (ii) Basic life support

U 11.1.3 In addition to the above, learners may be enrolled in one of the following programmes which will be run concurrently:

- (a) Local language programme
- (b) English language programme
- (c) Computer skills
- (d) These may be done in the last two hours of the day for the duration of the Foundation Course.

U 11.1.4 These sessions must be as interactive as possible.

U 11.1.5 Sports (to be used through the Foundation Course as protected 04 hours / week).

U 11.1.6 Leisure and extracurricular activity (to be used through the Foundation Course as protected 02 hours per week).

U 11.1.7 Institutions shall develop learning modules and identify the appropriate resource persons for their delivery.

U 11.1.8 The time committed for the Foundation Course may not be used for any other curricular activity.

U 11.1.9 The Foundation Course will have compulsory 75% attendance. This will be certified by the Dean of the college.

U 11.1.10 The Foundation Course will be organized by the Coordinator appointed by the Dean of the college and will be under supervision of the heads of the preclinical departments.

U 11.1.11 Every college must arrange for a meeting with parents and their wards.

U 11.2. Early Clinical Exposure

U 11.2.1 **Objectives:** The objectives of early clinical exposure of the first-year medical learners are to enable the learner to:

- (a) Recognize the relevance of basic sciences in diagnosis, patient care and treatment,
- (b) Provide a context that will enhance basic science learning,
- (c) Relate to experience of patients as a motivation to learn,
- (d) Recognize attitude, ethics and professionalism as integral to the doctor-patient relationship,
- (e) Understand the socio-cultural context of disease through the study of humanities.

U 11.2.2 Elements

(a) Basic science correlation: i.e. apply and correlate principles of basic sciences as they relate to the care of the patient (this will be part of integrated modules).

(b) Clinical skills: to include basic skills in interviewing patients, doctor-patient communication, ethics and professionalism, critical thinking and analysis and self-learning (this training will be imparted in the time allotted for early clinical exposure).

(c) Humanities: To introduce learners to a broader understanding of the socio-economic framework and cultural context within which health is delivered through the study of humanities and social sciences.

U 11.3. Electives

U 11.3.1 **Objectives:** To provide the learner with opportunities:

- (a) For diverse learning experiences,
- (b) To do research/community projects that will stimulate enquiry, self-directed, experiential learning and lateral thinking.

U 11.3.2 Two months are designated for elective rotations after completion of the examination at end of the third MBBS Part I and before commencement of third MBBS Part II.

U 11.3.3 It is mandatory for learners to do an elective. The elective time should not be used to make up for missed clinical postings, shortage of attendance or other purposes.

U 11.3.4 Structure

- (a) The learner shall rotate through two elective blocks of 04 weeks each.
 - (b) Block 1 shall be done in a pre-selected preclinical or para-clinical or other basic sciences laboratory OR under a researcher in an ongoing research project. During the electives regular clinical postings shall continue.
 - (c) Block 2 shall be done in a clinical department (including specialties, super-specialties, ICUs, blood bank and casualty) from a list of electives developed and available in the institution.
- OR

as a supervised learning experience at a rural or urban community clinic.

(d) Institutions will pre-determine the number and nature of electives, names of the supervisors, and the number of learners in each elective based on the local conditions, available resources and faculty.

U 11.3.5 Each institution will develop its own mechanism for allocation of electives.

U 11.3.6 It is preferable that elective choices are made available to the learners in the beginning of the academic year.

U 11.3.7 The learner must submit a learning log book based on both blocks of the elective.

U 11.3.8 75% attendance in the electives and submission of log book maintained during elective is required for eligibility to appear in the final MBBS examination.

U 11.3.9 Institutions may use part of this time for strengthening basic skill certification.

U 11.4. Professional Development including Attitude, Ethics and Communication Module (AETCOM)

U 11.4.1 Objectives of the programme: At the end of the programme, the learner must demonstrate ability to:

(a) understand and apply principles of bioethics and law as they apply to medical practice and Research, understand and apply the principles of clinical reasoning as they apply to the care of the patients

(b) understand and apply the principles of system based care as they relate to the care of the patient.

(c) understand and apply empathy and other human values to the care of the patient,

(d) communicate effectively with patients, families, colleagues and other health care professionals,

(e) understand the strengths and limitations of alternative systems of medicine,

(f) respond to events and issues in a professional, considerate and humane fashion,

(g) translate learning from the humanities in order to further his / her professional and personal growth.

U 11.4.2 Learning experiences:

(a) This will be a longitudinal programme spread across the continuum of the MBBS programme including internship,

(b) Learning experiences may include – small group discussions, patient care scenarios, workshop, seminars, role plays, lectures etc.

(c) Attitude, Ethics & Communication Module (AETCOM module) developed by Medical Council of India should be used longitudinally for purposes of instruction.

U 11.4.3 75% attendance in Professional Development Programme (AETCOM Module) is required for eligibility to appear for final examination in each professional year.

U 11.4.4 Internal Assessment will include:

- (a) Written tests comprising of short notes and creative writing experiences,
- (b) OSCE based clinical scenarios / viva voce.

U 11.4.5 At least one question in each paper of the clinical specialties in the University examination should test knowledge competencies acquired during the professional development programme.

U 11.4.6 Skill competencies acquired during the Professional Development Programme must be tested during the clinical, practical and viva voce.

U 11.5. Learner-doctor method of clinical training (Clinical Clerkship)

U 11.5.1 **Goal:** To provide learners with experience in:

- (a) Longitudinal patient care,
- (b) Being part of the health care team,
- (c) Hands-on care of patients in outpatient and inpatient setting.

U 11.5.2 **Structure:**

- (a) The first clinical posting in second professional shall orient learners to the patient, their roles and the specialty.
- (b) The learner-doctor programme will progress as outlined in Table 9.
- (c) The learner will function as a part of the health care team with the following responsibilities:

- (i) Be part of the unit's outpatient services on admission days,
- (ii) Remain with the admission unit until 6 PM except during designated class hours,
- (iii) Be assigned patients admitted during each admission day for whom he/she will undertake responsibility, under the supervision of a senior resident or faculty member,
- (iv) Participate in the unit rounds on its admission day and will present the assigned patients to the supervising physician,
- (v) Follow the patient's progress throughout the hospital stay until discharge,
- (vi) Participate, under supervision, in procedures, surgeries, deliveries etc. of assigned patients (according to responsibilities outlined in table 9),
- (vii) Participate in unit rounds on at least one other day of the week excluding the admission day,
- (viii) Discuss ethical and other humanitarian issues during unit rounds,
- (ix) Attend all scheduled classes and educational activities,
- (x) Document his/her observations in a prescribed log book / case record.

(d) No learner will be given independent charge of the patient

(e) The supervising physician will be responsible for all patient care decisions

U 11.5.3 **Assessment:**

- (a) A designated faculty member in each unit will coordinate and facilitate the activities of the learner, monitor progress, provide feedback and review the log book/ case record.

(b) The log book/ case record must include the written case record prepared by the learner including relevant investigations, treatment and its rationale, hospital course, family and patient discussions, discharge summary etc.

(c) The log book should also include records of outpatients assigned. Submission of the log book/ case record to the department is required for eligibility to appear for the final examination of the subject.

Table 9: Learner - Doctor programme (Clinical Clerkship)

Year of Curriculum	Focus of Learner - Doctor programme
Year 1	Introduction to hospital environment, early clinical exposure, understanding perspectives of illness
Year 2	History taking, physical examination, assessment of change in clinical status, communication and patient education
Year 3	All of the above and choice of investigations, basic procedures and continuity of care
Year 4	All of the above and decision making, management and outcomes

U 12. Program Delivery

The courses are delivered in accordance with the timetable provided at the beginning of the academic year. The delivery of a theory course may include but is not limited to:

1. Face-to-Face Lectures using Audio-Visuals
2. Dissections
3. Practical classes
4. Bed side teaching
5. Case based learning
6. Self-directed learning
7. Seminars
8. Guest Lectures
9. Small Group Discussion
10. Community based teaching program.

Practical/Clinical training is delivered through a combination of instructions and demonstrations. Clinical training consists of observing, assisting, and performing under supervision.

COMPETENCY BASED CURRICULUM OF THE INDIAN MEDICAL GRADUATE PROGRAMME

U 13. Curriculum

The curriculum includes the following:

1. **Program Specifications (PS):** This document contains the Program aims, objectives, learning outcomes and the detailed Program structure as described in Annexure-1.

2. **Course Specifications (CS):** This document contains the course title, course outcomes, course contents, teaching and learning methods, and recommended course resources for each of the courses.

U 13.1 Development of Program Curriculum

The Vice Chancellor appoints Board of studies committee (BOS) which also includes External members for formulating the curriculum of various courses for MBBS Degree Program. The curriculum is then presented to the Academic Council and Board of Management for their approval and then the Program will be offered by the University.

The curriculum for the program will be reviewed periodically based on the recommendations of the National Medical Commission with amendments issued from time to time.

U 13.2 Curriculum Framework

U 14. Specific Competencies

U 14.1. Preamble:

The salient feature of the revision of the medical curriculum in 2019 is the emphasis on learning which is competency-based, integrated and learner-centered acquisition of skills and ethical & humanistic values.

Each of the competencies described below must be read in conjunction with the goals of the medical education as listed in items 2 to 3.5.5

It is recommended that didactic teaching be restricted to less than one third of the total time allotted for that discipline. Greater emphasis is to be laid on hands-on training, symposia, seminars, small group discussions, problem-oriented and problem-based discussions and self-directed learning. Learners must be encouraged to take active part in and shared responsibility for their learning.

The global competencies to be achieved by the learner are outlined above in Chapter 1- section 3. Since the MBBS programme assessment will continue to be subject based, subject specific competencies have been outlined. These have to be acquired by the learner in the corresponding professional year. These competencies must be interpreted in the larger context outlined in section 3 and may be considered as “sub competencies” of the global competencies.

U 14.2. Integration

Integration must be horizontal (i.e. across disciplines in a given phase of the course) and vertical (across different phases of the course). As far as possible, it is desirable that teaching/learning occurs in each phase through study of organ systems or disease blocks in order to align the learning process. Clinical cases must be used to integrate and link learning across disciplines.

U 14.3. Pre-clinical Subjects

U 14.3.1. Human Anatomy

(a) **Competencies:** The undergraduate must demonstrate:

1. Understanding of the gross and microscopic structure and development of human body,
2. Comprehension of the normal regulation and integration of the functions of the organs and systems on basis of the structure and genetic pattern,
3. Understanding of the clinical correlation of the organs and structures involved and interpret the anatomical basis of the disease presentations.

(b) **Integration:** The teaching should be aligned and integrated horizontally and vertically in organ systems with clinical correlation that will provide a context for the learner to understand the relationship between structure and function and interpret the anatomical basis of various clinical conditions and procedures.

U 14.3.2. Physiology

(a) **Competencies:** The undergraduates must demonstrate:

1. Understanding of the normal functioning of the organs and organ systems of the body,
2. Comprehension of the normal structure and organization of the organs and systems on basis of the functions,
3. Understanding of age-related physiological changes in the organ functions that reflect normal growth and development,
4. Understand the physiological basis of diseases.

(b) **Integration:** The teaching should be aligned and integrated horizontally and vertically in organ systems in order to provide a context in which normal function can be correlated both with structure and with the biological basis, its clinical features, diagnosis and therapy.

U 14.3.3. Biochemistry

The course will comprise Molecular and Cellular Biochemistry.

(a) **Competencies:** The learner must demonstrate an understanding of:

1. Biochemical and molecular processes involved in health and disease,
2. Importance of nutrition in health and disease,
3. Biochemical basis and rationale of clinical laboratory tests, and demonstrate ability to interpret these in the clinical context.

(b) **Integration:** The teaching/learning programme should be integrated horizontally and vertically, as much as possible, to enable learners to make clinical correlations and to acquire an understanding of the cellular and molecular basis of health and disease.

U 14.3.4. Introduction to Community Medicine

(a) **Competencies:** The undergraduate must demonstrate:

1. Understanding of the concept of health and disease,
2. Understanding of demography, population dynamics and disease burden in National and global context,
3. Comprehension of principles of health economics and hospital management,
4. Understanding of interventions to promote health and prevent diseases as envisioned in National and State Health Programmes.

U 14.4. Second Professional (Para-Clinical)

U 14.4.1. Pathology

(a) **Competencies:** The undergraduate must demonstrate:

1. Comprehension of the causes, evolution and mechanisms of diseases,
2. Knowledge of alterations in gross and cellular morphology of organs in disease states,
3. Ability to correlate the natural history, structural and functional changes with the clinical manifestations of diseases, their diagnosis and therapy,

(b) **Integration:** The teaching should be aligned and integrated horizontally and vertically in organ systems recognizing deviations from normal structure and function and clinically correlated so as to provide an overall understanding of the etiology, mechanisms, laboratory diagnosis, and management of diseases.

U 14.4.2. Microbiology

(a) **Competencies:** The undergraduate learner demonstrate:

1. Understanding of role of microbial agents in health and disease,
2. Understanding of the immunological mechanisms in health and disease,
3. Ability to correlate the natural history, mechanisms and clinical manifestations of infectious diseases as they relate to the properties of microbial agents,
4. Knowledge of the principles and application of infection control measures,
5. An understanding of the basis of choice of laboratory diagnostic tests and their interpretation, antimicrobial therapy, control and prevention of infectious diseases.

(b) **Integration:** The teaching should be aligned and integrated horizontally and vertically in organ systems with emphasis on host-microbe-environment interactions and their alterations in disease and clinical correlations so as to provide an overall understanding of the etiological agents, their laboratory diagnosis and prevention.

U 14.4.3. Pharmacology

(a) **Competencies:** The undergraduate must demonstrate:

1. Knowledge about essential and commonly used drugs and an understanding of the pharmacologic basis of therapeutics,

2. Ability to select and prescribe medicines based on clinical condition and the pharmacologic properties, efficacy, safety, suitability and cost of medicines for common clinical conditions of national importance,
3. Knowledge of pharmacovigilance, essential medicine concept and sources of drug information and industry-doctor relationship,
4. Ability to counsel patients regarding appropriate use of prescribed drug and drug delivery systems.

(b) **Integration:** The teaching should be aligned and integrated horizontally and vertically in organ systems recognizing the interaction between drug, host and disease in order to provide an overall understanding of the context of therapy.

U 14.4.4. Forensic Medicine and Toxicology

(a) **Competencies:** The learner must demonstrate:

1. Understanding of medico-legal responsibilities of physicians in primary and secondary care settings,
2. Understanding of the rational approach to the investigation of crime, based on scientific and legal principles,
3. Ability to manage medical and legal issues in cases of poisoning / overdose,
4. Understanding the medico-legal framework of medical practice and medical negligence,
5. Understanding of codes of conduct and medical ethics.

(b) **Integration:** The teaching should be aligned and integrated horizontally and vertically recognizing the importance of medico-legal, ethical and toxicological issues as they relate to the practice of medicine.

U 14.4.5. Community Medicine – as per U 14.3.4

U 14.5. Third Professional (Part I)

U 14.5.1. General Medicine

(a) **Competencies:** The student must demonstrate ability to do the following in relation to common medical problems of the adult in the community:

1. Demonstrate understanding of the patho-physiologic basis, epidemiological profile, signs and symptoms of disease and their investigation and management,
2. Competently interview and examine an adult patient and make a clinical diagnosis,
3. Appropriately order and interpret laboratory tests,
4. Initiate appropriate cost-effective treatment based on an understanding of the rational drug prescriptions, medical interventions required and preventive measures,
5. Follow up of patients with medical problems and refer whenever required,
6. Communicate effectively, educate and counsel the patient and family,
7. Manage common medical emergencies and refer when required,
8. Independently perform common medical procedures safely and understand patient safety issues.

(b) **Integration:** The teaching should be aligned and integrated horizontally and vertically in order to provide sound biologic basis and incorporating the principles of general medicine into a holistic and comprehensive approach to the care of the patient.

U 14.5.2. General Surgery

(a) **Competencies:** The student must demonstrate:

1. Understanding of the structural and functional basis, principles of diagnosis and management of common surgical problems in adults and children,
2. Ability to choose, calculate and administer appropriately intravenous fluids, electrolytes, blood and blood products based on the clinical condition,
3. Ability to apply the principles of asepsis, sterilization, disinfection, rational use of prophylaxis, therapeutic utilities of antibiotics and universal precautions in surgical practice,
4. Knowledge of common malignancies in India and their prevention, early detection and therapy,
5. Ability to perform common diagnostic and surgical procedures at the primary care level,
6. Ability to recognize, resuscitate, stabilize and provide Basic & Advanced Life Support to patients following trauma,
7. Ability to administer informed consent and counsel patient prior to surgical procedures,
8. Commitment to advancement of quality and patient safety in surgical practice.

(b) **Integration:** The teaching should be aligned and integrated horizontally and vertically in order to provide a sound biologic basis and a holistic approach to the care of the surgical patient.

U 14.5.3. Obstetrics and Gynaecology

(a) **Competencies in Obstetrics:** The student must demonstrate ability to:

1. Provide peri-conceptional counseling and antenatal care,
2. Identify high-risk pregnancies and refer appropriately,
3. Conduct normal deliveries, using safe delivery practices in the primary and secondary care settings,
4. Prescribe drugs safely and appropriately in pregnancy and lactation,
5. Diagnose complications of labor, institute primary care and refer in a timely manner,
6. Perform early neonatal resuscitation,
7. Provide postnatal care, including education in breast-feeding,
8. Counsel and support couples in the correct choice of contraception,
9. Interpret test results of laboratory and radiological investigations as they apply to the care of the obstetric patient,
10. Apply medico-legal principles as they apply to tubectomy, Medical Termination of Pregnancy(MTP), Pre-conception and Prenatal Diagnostic Techniques (PC PNDT Act) and other related Acts.

Competencies in Gynecology: The student must demonstrate ability to:

1. Elicit a gynecologic history, perform appropriate physical and pelvic examinations and PAP smear in the primary care setting,
2. Recognize, diagnose and manage common reproductive tract infections in the primary care setting,
3. Recognize and diagnose common genital cancers and refer them appropriately.

(b) **Integration:** The teaching should be aligned and integrated horizontally and vertically in order to provide comprehensive care for women in their reproductive years and beyond, based on a sound knowledge of structure, functions and disease and their clinical, social, emotional, psychological correlates in the context of national health priorities.

U 14.5.4. Pediatrics

(a) **Competencies:** The student must demonstrate:

1. Ability to assess and promote optimal growth, development and nutrition of children and adolescents and identify deviations from normal,
2. Ability to recognize and provide emergency and routine ambulatory and First Level Referral Unit care for neonates, infants, children and adolescents and refer as may be appropriate,
3. Ability to perform procedures as indicated for children of all ages in the primary care setting,
4. Ability to recognize children with special needs and refer appropriately,
5. Ability to promote health and prevent diseases in children,
6. Ability to participate in National Programmes related to child health and in conformation with the Integrated Management of Neonatal and Childhood Illnesses (IMNCI) Strategy,
7. Ability to communicate appropriately and effectively.

(b) **Integration:** The teaching should be aligned and integrated horizontally and vertically in order to provide comprehensive care for neonates, infants, children and adolescents based on a sound knowledge of growth, development, disease and their clinical, social, emotional, psychological correlates in the context of national health priorities.

U 14.5.5. Orthopaedics (including Trauma)

(a) **Competencies:** The student must demonstrate:

1. Ability to recognize and assess bone injuries, dislocation and poly-trauma and provide first contact care prior to appropriate referral,
2. Knowledge of the medico-legal aspects of trauma,
3. Ability to recognize and manage common infections of bone and joints in the primary care setting,
4. Recognize common congenital, metabolic, neoplastic, degenerative and inflammatory bone diseases and refer appropriately,
5. Ability to perform simple orthopaedic techniques as applicable to a primary care setting,
6. Ability to recommend rehabilitative services for common orthopaedic problems across all ages.

(b) **Integration:** The teaching should be aligned and integrated horizontally and vertically in order to allow the student to understand the structural basis of orthopaedic problems, their management and correlation with function, rehabilitation and quality of life.

U 14.5.6. Forensic Medicine and Toxicology – as per U 14.4.4

U 14.5.7. Community medicine

(a) **Competencies:** The learner must demonstrate:

1. Understanding of physical, social, psychological, economic and environmental determinants of health and disease,
2. Ability to recognize and manage common health problems including physical, emotional and social aspects at individual family and community level in the context of National Health Programmes,
3. Ability to Implement and monitor National Health Programmes in the primary care setting,

4. Knowledge of maternal and child wellness as they apply to national health care priorities and programmes,
5. Ability to recognize, investigate, report, plan and manage community health problems including malnutrition and emergencies.

(b) **Integration:** The teaching should be aligned and integrated **horizontally** and vertically in order to allow the learner to understand the impact of environment, society and national health priorities as they relate to the promotion of health and prevention and cure of disease.

U 14.5.8. Dermatology, Venereology & Leprosy

(a) **Competencies:** The undergraduate student must demonstrate:

1. Understanding of the principles of diagnosis of diseases of the skin, hair, nail and mucosa,
2. Ability to recognize, diagnose, order appropriate investigations and treat common diseases of the skin including leprosy in the primary care setting and refer as appropriate,
3. A syndromic approach to the recognition, diagnosis, prevention, counseling, testing and management of common sexually transmitted diseases including HIV based on national health priorities,
4. Ability to recognize and treat emergencies including drug reactions and refer as appropriate.

(b) **Integration:** The teaching should be aligned and integrated horizontally and vertically in order to emphasize the biologic basis of diseases of the skin, sexually transmitted diseases and leprosy and to provide an understanding that skin diseases may be a manifestation of systemic disease.

U 14.5.9. Psychiatry

(a) **Competencies:** The student must demonstrate:

1. Ability to promote mental health and mental hygiene,
2. Knowledge of etiology (bio-psycho-social-environmental interactions), clinical features, diagnosis and management of common psychiatric disorders across all ages,
3. Ability to recognize and manage common psychological and psychiatric disorders in a primary care setting, institute preliminary treatment in disorders difficult to manage, and refer appropriately,
4. Ability to recognize alcohol/ substance abuse disorders and refer them to appropriate centers,
5. Ability to assess risk for suicide and refer appropriately,
6. Ability to recognize temperamental difficulties and personality disorders,
7. Assess mental disability and rehabilitate appropriately,
8. Understanding of National and State programmes that address mental health and welfare of patients and community.

(b) **Integration:** The teaching should be aligned and integrated horizontally and vertically in order to allow the student to understand bio-psycho-social-environmental interactions that lead to diseases/disorders for preventive, promotive, curative, rehabilitative services and medico-legal implications in the care of patients both in family and community.

U 14.5.10 Respiratory Medicine

(a) **Competencies:** The student must demonstrate:

1. Knowledge of common chest diseases, their clinical manifestations, diagnosis and management,
2. Ability to recognize, diagnose and manage pulmonary tuberculosis as contemplated in National Tuberculosis Control programme,
3. Ability to manage common respiratory emergencies in primary care setting and refer appropriately.

(b) Integration: The teaching should be aligned and integrated horizontally and vertically in order to allow the student to recognize diagnose and treat TB in the context of the society, national health priorities, drug resistance and co-morbid conditions like HIV.

U 14.5.11 Otorhinolaryngology

(a) Competencies: The learner must demonstrate:

1. Knowledge of the common Otorhinolaryngological (ENT) emergencies and problems,
2. Ability to recognize, diagnose and manage common ENT emergencies and problems in primary care setting,
3. Ability to perform simple ENT procedures as applicable in a primary care setting,
4. Ability to recognize hearing impairment and refer to the appropriate hearing impairment rehabilitation programme.

(b) Integration: The teaching should be aligned and integrated horizontally and vertically in order to allow the learner to understand the structural basis of ENT problems, their management and correlation with function, rehabilitation and quality of life.

U 14.5.12 Ophthalmology

(a) Competencies: The student must demonstrate:

1. Knowledge of common eye problems in the community
2. Recognize, diagnose and manage common eye problems and identify indications for referral,
3. Ability to recognize visual impairment and blindness in the community and implement National programmes as applicable in the primary care setting.

(b) Integration: The teaching should be aligned and integrated horizontally and vertically in order to allow the student to understand the structural basis of ophthalmologic problems, their management and correlation with function, rehabilitation and quality of life.

U 14.5.13a Radiodiagnosis

(a) Competencies: The student must demonstrate:

1. Understanding of indications for various radiological investigations in common clinical practice,
2. Awareness of the ill effects of radiation and various radiation protective measures to be employed,
3. Ability to identify abnormalities in common radiological investigations.

(b) Integration: Horizontal and vertical integration to understand the fundamental principles of radiologic imaging, anatomic correlation and their application in diagnosis and therapy.

U 14.5.13b Radiotherapy

(a) Competencies: The student must demonstrate understanding of:

1. Clinical presentations of various cancers,
2. Appropriate treatment modalities for various types of malignancies,
3. Principles of radiotherapy and techniques.

(b) Integration: Horizontal and vertical integration to enable basic understanding of fundamental principles of radio-therapeutic procedures.

U 14.5.14 Anaesthesiology

(a) Competencies in Anaesthesiology: The student must demonstrate ability to:

1. Describe and discuss the pre-operative evaluation, assessing fitness for surgery and the modifications in medications in relation to anaesthesia / surgery,
2. Describe and discuss the roles of Anaesthesiologist as a peri-operative physician including pre-medication, endotracheal intubation, general anaesthesia and recovery (including variations in recovery from anaesthesia and anaesthetic complications),
3. Describe and discuss the management of acute and chronic pain, including labour analgesia,
4. Demonstrate awareness about the maintenance of airway in children and adults in various situations,
5. Demonstrate the awareness about the indications, selection of cases and execution of cardiopulmonary resuscitation in emergencies and in the intensive care and high dependency units,
6. Choose cases for local / regional anaesthesia and demonstrate the ability to administer the same,
7. Discuss the implications and obtain informed consent for various procedures and to maintain the documents.

(b) Integration: The teaching should be aligned and integrated horizontally and vertically in order to provide comprehensive care for patients undergoing various surgeries, in patients with pain, in intensive care and in cardio respiratory emergencies. Integration with the preclinical department of Anatomy, para- clinical department of Pharmacology and horizontal integration with any/all surgical specialities is proposed.

U 14.6 Family adoption Program

Family adoption program is recommended as a part of curriculum of Community Medicine and will begin from first Professional year. The orientation for the family adoption program would be a part of the theme of field visit to Community health centre during the foundation course itself. The villages included in the programme would include such villages that are not covered under the primary health centre that is adopted under the institution.

Family adoption program is introduced with an aim to overcome barriers related to access to healthcare such as health illiteracy, lack of awareness regarding communicable and non-communicable diseases to the rural and needy population.

Family adoption program aims to provide experiential learning opportunity to the Indian medical graduates towards community based health care.

National Medical Commission Circular dated 31st March 2022 NO. U. 11026/1/2022- UGMEB

U 15 Assessment

Attendance requirement is as per National Medical Commission regulations with amendments issued from time to time.

Eligibility to appear for Professional examinations

(a) Attendance

1. Attendance requirements are 75% in theory and 80% in practical /clinical for eligibility to appear for the examinations in that subject. In subjects that are taught in more than one phase – the learner must have 75% attendance in theory and 80% in practical in each phase of instruction in that subject.

2. If an examination comprises more than one subject (for e.g., General Surgery and allied branches), the candidate must have 75% attendance in each subject and 80% attendance in each clinical posting.

3. Learners who do not have at least 75% attendance in the electives will not be eligible for the Third Professional - Part II examination.

(a) **Internal Assessment:** Internal assessment shall be based on day-to-day assessment. It shall relate to different ways in which learners participate in learning process including assignments, preparation for seminar, clinical case presentation, preparation of clinical case for discussion, clinical case study/problem solving exercise, participation in project for health care in the community, proficiency in carrying out a practical or a skill in small research project, a written test etc.

1. Regular periodic examinations shall be conducted throughout the course. There shall be no less than three internal assessment examinations in each Preclinical / Para-clinical subject and no less than two examinations in each clinical subject in a professional year. An end of posting clinical assessment shall be conducted for each clinical posting in each professional year.
2. When subjects are taught in more than one phase, the internal assessment must be done in each phase and must contribute proportionately to final assessment. For example, General Medicine must be assessed in second Professional, third Professional Part I and third Professional Part II, independently.
3. Day to day records and log book (including required skill certifications) should be given importance in internal assessment. Internal assessment should be based on competencies and skills.
4. The final internal assessment in a broad clinical specialty (e.g., Surgery and allied specialties etc.) shall comprise of marks from all the constituent specialties. The proportion of the marks for each constituent specialty shall be determined by the time of instruction allotted to each.
5. Learners must secure at least 50% marks of the total marks (combined in theory and practical / clinical; not less than 40 % marks in theory and practical separately) assigned for internal assessment in a particular subject in order to be eligible for appearing at the final University examination of that subject. Internal assessment marks will reflect as separate head of passing at the summative examination.
6. The results of internal assessment should be displayed on the notice board within a 1-2 weeks of the test. Universities shall guide the colleges regarding formulating policies for remedial measures for

students who are either not able to score qualifying marks or have missed on some assessments due to any reason.

7. Learners must have completed the required certifiable competencies for that phase of training and completed the log book appropriate for that phase of training to be eligible for appearing at the final university examination of that subject.

U 15.1 University Examinations

1. University examinations are to be designed with a view to ascertain whether the candidate has acquired the necessary knowledge, minimal level of skills, ethical and professional values with clear concepts of the fundamentals which are necessary for him/her to function effectively and appropriately as a physician of first contact. Assessment shall be carried out on an objective basis to the extent possible.
2. Nature of questions will include different types such as structured essays (Long Answer Questions- LAQ), Short Answers Questions (SAQ) and objective type questions (e.g. Multiple Choice Questions - MCQ). Marks for each part should be indicated separately. MCQs shall be accorded a weightage of not more than 20% of the total theory marks. In subjects that have two papers, the learner must secure at least 40% marks in each of the papers with minimum 50% of marks in aggregate (both papers together) to pass.
3. Practical/clinical examinations will be conducted in the laboratories and /or hospital wards. The objective will be to assess proficiency and skills to conduct experiments, interpret data and form logical conclusion. Clinical cases kept in the examination must be common conditions that the learner may encounter as a physician of first contact in the community. Selection of rare syndromes and disorders as examination cases is to be discouraged. Emphasis should be on candidate's capability to elicit history, demonstrate physical signs, write a case record, analyze the case and develop a management plan.
4. Viva/oral examination should assess approach to patient management, emergencies, attitudinal, ethical and professional values. Candidate's skill in interpretation of common investigative data, X-rays, identification of specimens, ECG, etc. is to be also assessed.
5. There shall be one main examination in an academic year and a supplementary to be held not later than 90 days after the declaration of the results of the main examination.
6. A learner shall not be entitled to graduate after 10 years of his/her joining of the first part of the MBBS course.
7. University Examinations shall be held as under:

(a) First Professional

1. The first Professional examination shall be held at the end of first Professional training (1+12 months), in the subjects of Human Anatomy, Physiology and Biochemistry.
2. A maximum number of four permissible attempts would be available to clear the first Professional University examination, whereby the first Professional course will have to be cleared within 4 years of admission to the said course. Partial attendance at any University examination shall be counted as an availed attempt.

(b) Second Professional

1. The second Professional examination shall be held at the end of second professional training (11 months), in the subjects of Pathology, Microbiology, and Pharmacology.

(c) Third Professional

1. Third Professional Part I shall be held at end of third Professional part 1 of training (12 months) in the subjects of Ophthalmology, Otorhinolaryngology, Community Medicine and Forensic Medicine and Toxicology
2. Third Professional Part II - (Final Professional) examination shall be at the end of training (14 months including 2 months of electives) in the subjects of General Medicine, General Surgery, Obstetrics & Gynecology and Pediatrics. The discipline of Orthopedics, Anesthesiology, Dentistry and Radiodiagnosis will constitute 25% of the total theory marks incorporated as a separate section in paper II of General Surgery.
3. The discipline of Psychiatry and Dermatology, Venereology and Leprosy (DVL), Respiratory Medicine including Tuberculosis will constitute 25% of the total theory marks in General Medicine incorporated as a separate section in paper II of General Medicine.

(d) Examination schedule is in Table 1.

(e) Marks distribution is in Table 10.

Table 10 : Marks distribution for various subjects

Phase of Course	Written-Theory – Total	Practicals/Orals/ Clinicals	Pass Criteria
First Professional			<u>Internal Assessment:</u> 50% combined in theory and practical (not less than 40% in each) for eligibility for appearing for University Examinations
Human Anatomy - 2 papers	200	100	
Physiology - 2 papers	200	100	
Biochemistry - 2 papers	200	100	
Second Professional			
Pharmacology - 2 Papers	200	100	
Pathology - 2 papers	200	100	
Microbiology - 2 papers	200	100	
Third Professional Part – I			
Forensic Medicine & Toxicology - 1 paper	100	100	
Ophthalmology – 1 paper	100	100	<u>University Examination</u> Mandatory 50% marks separately in theory and
Otorhinolaryngology – 1 paper	100	100	

Community Medicine - 2 papers	200	100	practical (practical = practical/ clinical + viva)
Third Professional Part – II			
General Medicine - 2 papers	200	200	
General Surgery - 2 papers	200	200	
Pediatrics – 1 paper 100 100	100	100	
Obstetrics &Gynaecology - 2 papers	200	200	

Note: At least one question in each paper of the clinical specialties should test knowledge - competencies acquired during the professional development programme (AETCOM module); Skills competencies acquired during the Professional Development programme (AETCOM module) must be tested during clinical, practical and viva.

In subjects that have two papers, the learner must secure at least 40% marks in each of the papers with minimum 50% of marks in aggregate (both papers together) to pass in the said subject.

U 15.1.1 Criteria for passing in a subject: A candidate shall obtain 50% marks in University conducted examination separately in Theory and Practical (practical includes: practical/ clinical and viva voce) in order to be declared as passed in that subject.

U 15.1.2 Appointment of Examiners

- (a) Person appointed as an examiner in the particular subject must have at least four years of total teaching experience as assistant professor after obtaining postgraduate degree in the subject in a college affiliated to a recognized/ approved/ permitted medical college.
- (b) For the Practical/ Clinical examinations, there shall be at least four examiners for 100 learners, out of whom not less than 50% must be external examiners. Of the four examiners, the senior-most internal examiner will act as the Chairman and coordinator of the whole examination programme so that uniformity in the matter of assessment of candidates is maintained. Where candidates appearing are more than 100, two additional examiners (one external & one internal) for every additional 50 or part thereof of candidates appearing, be appointed.
- (c) In case of non-availability of medical teachers, approved teachers without a medical degree (engaged in the teaching of MBBS students as whole-time teachers in a recognized medical college), may be appointed examiners in their concerned subjects provided they possess requisite doctorate qualifications and four years teaching experience (as assistant professors) of MBBS students. Provided further that the 50% of the examiners (Internal & External) are from the medical qualification stream.
- (d) External examiners may not be from the same University.
- (e) The internal examiner in a subject shall not accept external examinership for a college from which external examiner is appointed in his/her subject.

- (f) A University having more than one college shall have separate sets of examiners for each college, with internal examiners from the concerned college.
- (g) External examiners shall rotate at an interval of 2 years.
- (h) There shall be a Chairman of the Board of paper-setters who shall be an internal examiner and shall moderate the questions.
- (i) All eligible examiners with requisite qualifications and experience can be appointed internal examiners by rotation in their subjects.
- (j) All theory paper assessment should be done as central assessment program (CAP) of concerned university.
- (k) Internal examiners should be appointed from same institution for unitary examination in same institution. For pooled examinations at one centre approved internal examiners from same university may be appointed.
- (l) The grace marks up to a maximum of five marks may be awarded at the discretion of the University to a learner for clearing the examination as a whole but not for clearing a subject resulting in exemption.

U 15.2 INTERNSHIP

Internship is a phase of training wherein a graduate will acquire the skills and competencies for practice of medical and health care under supervision so that he/she can be certified for independent medical practice as an Indian Medical Graduate. In order to make trained work force available, it may be considered as a phase of training wherein the graduate is expected to conduct actual practice under the supervision of a trained doctor.

The learning methods and modalities have to be done during the MBBS course itself with larger number of hands on session and practice on simulators.

U 15.2.1. Goal:

The goal of the internship programme is to train medical students to fulfill their roles as doctors of first contact in the community.

U 15.2.2. Objectives: At the end of the internship period, the medical graduate will possess all competencies required of an Indian Medical Graduate, namely:

- a. Independently provide preventive, promotive, curative and palliative care with compassion,
- b. Function as leader and member of the health care team and health system,
- c. Communicate effectively with patients, families, colleagues and the community,
- d. Be certified in diagnostic and therapeutic skills in different disciplines of medicine taught in the undergraduate programme,
- e. Be a lifelong learner committed to continuous improvement of skills and knowledge,
- f. Be a professional committed to excellence and is ethical, responsive and accountable to patients, community and profession.

U 15.3 Time Distribution

Community Medicine (Residential posting) 3 months

General Medicine including 15 days of Psychiatry	2 months
General Surgery including 15 days Anaesthesia	2 months
Obstetrics & Gynaecology including	
Family Welfare Planning	2 months
Pediatrics	1 month
Orthopaedics including PM & R	1 month
Otorhinolaryngology	15 days
Ophthalmology	15 days
Casualty	15 days
Elective posting (1x15 days)	15 days

Subjects for Elective posting will be as follows:

1. Dermatology, Venereology & Leprosy
2. Respiratory Medicine
3. Radio diagnosis
4. Forensic Medicine & Toxicology
5. Blood Bank
6. Psychiatry

Note: Structure internship with assessment at the end in the college.

U 15.4 Other details:

- a. The core rotations of the internship shall be done in primary and secondary/ tertiary care institutions in India. In case of any difficulties, the matter may be referred to the Medical Council of India to be considered on individual merit.
- b. Every candidate will be required after passing the final MBBS examination to undergo compulsory rotational internship to the satisfaction of the College authorities and University concerned for a period of 12 months so as to be eligible for the award of the degree of Bachelor of Medicine and Bachelor of Surgery (MBBS) and full registration.
- c. The University shall issue a provisional MBBS pass certificate on passing the final examination.
- d. The State Medical Council will grant provisional registration to the candidate upon production of the provisional MBBS pass certificate. The provisional registration will be for a period of one year. In the event of the shortage or unsatisfactory work, the period of provisional registration and the compulsory rotating internship shall be suitably extended by the appropriate authorities.
- e. The intern shall be entrusted with clinical responsibilities under direct supervision of a designated supervising physician. They shall not work independently.
- f. Interns will not issue medical certificate or death certificate or other medico-legal document under their signature.
- g. Each medical college must ensure that the student gets learning experience in primary/secondary and urban/rural centers in order to provide a diverse learning experience and facilitate the implementation of national health programmes/ priorities. These shall include community and outreach activities,

collaboration with rural and urban community health centers, participation in government health missions etc.

- h. One year's approved service in the Armed Forces Medical Services, after passing the final MBBS examination shall be considered as equivalent to the pre-registration training detailed above; such training shall, as far as possible, be at the Base/General Hospital. The training in Community Medicine should fulfill the norms of the MCI as proposed above.
- i. In recognition of the importance of hands-on experience, full responsibility for patient care and skill acquisition, internship should be increasingly scheduled to utilize clinical facilities available in District Hospital, Taluka Hospital, Community Health Centre and Primary Health Centre, in addition to Teaching Hospital. A critical element of internship will be the acquisition of specific experiences and skill as listed in major areas: provided that where an intern is posted to District/Sub Divisional Hospital for training, there shall be a committee consisting of representatives of the college/University, the State Government and the District administration, who shall regulate the training of such trainee. Provided further that, for such trainee a certificate of satisfactory completion of training shall be obtained from the relevant administrative authorities which shall be countersigned by the Principal/Dean of College.

U 15.5 Assessment of Internship:

- a. The intern shall maintain a record of work in a log book, which is to be verified and certified by the medical officer under whom he/she works. Apart from scrutiny of the record of work, assessment and evaluation of training shall be undertaken by an objective approach using situation tests in knowledge, skills and attitude during and at the end of the training.
- b. Based on the record of work and objective assessment at the end of each posting, the Dean/Principal shall issue cumulative certificate of satisfactory completion of training at the end of internship, following which the University shall award the MBBS degree or declare him eligible for it.
- c. Full registration shall only be given by the State Medical Council/Medical Council of India on the award of the MBBS degree by the University or its declaration that the candidate is eligible for it.
- d. Some guidelines for the implementation of the training programme are given below.

U 15.6 INTERNSHIP – DISCIPLINE RELATED:

U 15.6.1 COMMUNITY MEDICINE

GOAL:

The aim of teaching the undergraduate student in Community Medicine is to impart such knowledge and skills that may enable him to diagnose and treat common medical illnesses and recognize the importance of community involvement. He/she shall acquire competence to deal effectively with an individual and the community in the context of primary health care. This is to be achieved by hands-on experience in the District Hospital and Primary Health Centre. The details are as under: -

I) District Hospital /Community Health Centre/Attachment to General Practitioner:

A. An intern must be able to do without assistance:

1. An intern must:

- a) Be able to diagnose common ailments and advise primary care;
- b) Demonstrate knowledge on 'Essential drugs' and their usage;
- c) Recognize medical emergencies, resuscitate and institute initial treatment and refer to a suitable institution.

2. An intern must be familiar with all National Health Programmes (e.g. RCH, UIP, CDD, ARI, FP, ANC, Tuberculosis, Leprosy and others), as recommended by the Ministry of Health and Family Welfare.

3. An intern must:

- a) Gain full expertise in immunization against infectious disease;
- b) Participate in programmes related to prevention and control of locally prevalent endemic diseases including nutritional disorders;
- c) Learn skills in family welfare planning procedures;

4. An intern must:

- a) Conduct programmes on health education,
- b) Gain capabilities to use Audiovisual aids,
- c) Acquire capability of utilization of scientific information for promotion of community health

B. An intern must have observed or preferably assisted at the following:

- 1. An intern should be capable of establishing linkages with other agencies as water supply, food distribution and other environmental/social agencies.
- 2. An intern should acquire managerial skills including delegation of duties to and monitoring the activities of paramedical staff and other health professionals.

II) Taluka Hospital/ First Referral Unit

A. An intern must be able to do without assistance:

- 1. An intern shall provide health education to an individual/community on:
 - a) tuberculosis,
 - b) small family, spacing, use of appropriate contraceptives,
 - c) applied nutrition and care of mothers and children,
 - d) immunization.

B. An intern must be able to do with supervision:

An intern shall attend at least one school health programme with the medical officer.

III) Primary Health Centre / Urban Health Centre

A. An intern must be able to do without assistance the following:

- a) Participate in family composite health care (birth to death), inventory of events.
- b) Participate in use of the modules on field practice for community health e.g. safe motherhood, nutrition surveillance and rehabilitation, diarrheal disorders etc.

- c) Participate in and maintain documents related to immunization and cold chain.
- d) Acquire competence in diagnosis and management of common ailments e.g. malaria, tuberculosis, enteric fever, congestive heart failure, hepatitis, meningitis acute renal failure etc.

B. An intern must be able to do under supervision the following:

- a) Acquire proficiency in Family Welfare Programmes (antenatal care, normal delivery, contraception etc.).
- b) Undergo village attachment of at least one week duration to understand issues of community health along with exposure to village health centres, ASHA Sub Centres.
- c) Participate in Infectious Diseases Surveillance and Epidemic Management activities along with the medical officer.

U 15.6.2 GENERAL MEDICINE

GOAL:

The aim of teaching the undergraduate student in General Medicine is to impart such knowledge and skills that may enable him to diagnose and treat common medical illnesses. He/she shall acquire competence in clinical diagnosis based on history, physical examination and relevant laboratory investigations and institute appropriate line of management; this would include diseases common in tropics (parasitic, bacterial or viral infections, nutritional disorders, including dehydration and electrolyte disturbances) and various system illnesses.

A. An intern must be able to do without assistance and interpret the results of:

i. the following laboratory investigations:

- a) Blood: (Routine haematology smear and blood groups),
- b) Urine: (Routine chemical and microscopic examination),
- c) Stool: (for ova/cyst and occult blood),
- d) Sputum and throat swab for gram stain or acid-fast stain, and
- e) Cerebrospinal Fluid (CSF) for smear,
- f) Electrocardiogram (ECG),
- g) Glucometer recording of blood sugar,
- h) routine radiographs of chest, abdomen, skull etc.

ii. Perform independently the following:

- a) diagnostic procedures
Proctoscopy,
Ophthalmoscopy/Otoscopy,
Indirect laryngoscopy.
- b) Therapeutic procedures;
Urethral catheterization,
Insertion of Ryle's Tube,
Pleural, Ascitic fluid aspiration,
Cerebrospinal Fluid (CSF) aspiration,
Air way tube installation,
Oxygen administration etc.

B. An intern must have observed or preferably assisted at the following operations/ procedures:

Biopsy Procedures: Liver, Kidney, Skin, Nerve, Lymph node, and muscle biopsy, Bone marrow aspiration, Biopsy of Malignant lesions on surface, nasal/nerve/skin smear for leprosy under supervision.

C. Skills that an intern should be able to perform under supervision:

- a) An intern should be familiar with lifesaving procedures, including use of aspirator, respirator and defibrillator, cardiac monitor, blood gas analyser.
- b) An intern should be able to advise about management and prognosis of acute & chronic illnesses like viral fever, gastroenteritis, hepatitis, pneumonias, myocardial infarction and angina, TIA and stroke, seizures, diabetes mellitus, hypertension renal and hepatic failure, thyroid disorders and hematological disorders. He should participate in counseling sessions for patients with non-communicable diseases and tuberculosis, HIV patients etc.
- c) Intern should be able to confirm death and demonstrate understanding of World Health Organisation cause of death reporting and data quality requirements.
- d) Intern should be able to demonstrate understanding of the coordination with local and national epidemic management plans.
- e) Intern shall be able to demonstrate prescribing skills and demonstrate awareness of pharmacovigilance, antibiotics policy, prescription audit and concept of essential medicines list.

U 15.6.3: PEDIATRICS:

GOAL:

The aim of teaching the undergraduate student in Pediatrics is to impart such knowledge and skills that may enable him to diagnose and treat common childhood illnesses including neonatal disorders. He/she shall acquire competence for clinical diagnosis based on history, physical examination and relevant laboratory investigations and institute appropriate line of management; this would include diseases common in tropics (parasitic, bacterial or viral infections, nutritional disorders, including dehydration and electrolyte disturbances) and various system illnesses.

A. An intern must be able to do without assistance:

An intern shall be able to diagnose and manage common childhood disorders including neonatal disorders and acute emergencies, examining sick child making a record of information.

An intern shall perform:

- a) **diagnostic techniques:** blood collection (including from femoral vein and umbilical cord), drainage of abscess, collection of cerebrospinal, pleural and peritoneal fluids, suprapubic aspiration of urine.
- b) **techniques related to patient care:** immunization, perfusion techniques, nasogastric tube insertion, feeding procedures, tuberculin testing & breast-feeding counseling.
- c) **use of equipments:** vital monitoring, temperature monitoring, resuscitation at birth and care of children receiving intensive care.
- d) institute early management of common childhood disorders with special reference to pediatric dosage and oral rehydration therapy.

B. An intern must have observed or preferably assisted at the following operations/ procedures:

- a) screening of newborn babies and those with risk factors for any anomalies and steps for prevention in future; detect congenital abnormalities;
- b) recognise growth abnormalities; recognise anomalies of psychomotor development;
- c) assess nutritional and dietary status of infants and children and organize prevention, detection and follow up of deficiency disorders both at individual and community levels, such as:
 - protein-energy malnutrition
 - deficiencies of vitamins especially A, B, C and D;
 - Iron deficiency

C. Skills that an intern should be able to perform under supervision:

- a) An intern should be familiar with life-saving procedures, including use of aspirator, respirator, cardiac monitor, blood gas analyser.
- b) An intern should be able to advise about management and prognosis of acute & chronic illnesses like viral fever, gastroenteritis, hepatitis, pneumonias, congenital heart diseases, seizures, renal and hepatic diseases, thyroid disorders and hematological disorders. She/he should participate in counseling sessions with parents including HIV counseling.

U 15.6.4: GENERAL SURGERY

GOAL:

The aim of teaching the undergraduate student in General Surgery is to impart such knowledge and skills that may enable him to diagnose and treat common surgical ailments. He/she shall have ability to diagnose and suspect with reasonable accuracy all acute and chronic surgical illnesses.

(A) THERAPEUTIC- An intern must perform or assist in:

- a) venesection or venous access
- b) tracheostomy and endotracheal intubation
- c) catheterization of patients with acute retention or trocar cystostomy
- d) drainage of superficial abscesses
- e) basic suturing of wound and wound management (including bandaging)
- f) biopsy of surface tumours
- g) perform vasectomy

(B) Skill that an intern should be able to perform under supervision:

- a) Advise about prognosis of acute & chronic surgical illnesses, head injury, trauma, burns and cancer. Counsel patients regarding the same.
- b) Advise about rehabilitation of patients after surgery and assist them for early recovery.
- c) Intern should be able to demonstrate understanding of World Health Organisation cause of death reporting and data quality requirements.
- d) Intern should be able to demonstrate understanding of the use of national and sub-national cause of death statistics.

(C) An intern must have observed or preferably assisted at the following operations/procedures:

- a) Resuscitation of critical patients
- b) Basic surgical procedures for major and minor surgical illnesses

- c) Wound dressings and application of splints
- d) Laparoscopic/ Minimally Invasive surgery
- e) Lymph node biopsy

U 15.6.5: CASUALTY:

GOAL:

The aim of teaching the undergraduate student in casualty is to impart such knowledge and skills that may enable him/her to diagnose and treat common acute surgical /medical ailments. He/she shall have ability to diagnose and suspect, with reasonable accuracy, acute surgical illnesses including emergencies, resuscitate critically injured patient and a severely burned patient, control surface bleeding and manage open wounds and monitor and institute first-line management of patients of head, spine, chest, abdominal and pelvic injury as well as acute abdomen.

(A) THERAPEUTIC- An intern must perform or assist in:

- a) Identification of acute emergencies in various disciplines of medical practice,
- b) Management of acute anaphylactic shock,
- c) Management of peripheral-vascular failure and shock,
- d) Management of acute pulmonary edema and Left Ventricular Failure (LVF),
- e) Emergency management of drowning, poisoning and seizure,
- f) Emergency management of bronchial asthma and status asthmaticus,
- g) Emergency management of hyperpyrexia,
- h) Emergency management of comatose patients regarding airways, positioning, prevention of aspiration and injuries,
- i) Assessment and administering emergency management of burns,
- j) Assessing and implementing emergency management of various trauma victims,
- k) Identification of medico-legal cases and learn filling up of forms as well as complete other medico-legal formalities in cases of injury, poisoning, sexual offenses, intoxication and other unnatural conditions.

(B) Skill that an intern should be able to perform under supervision:

- a) Advise about prognosis of acute surgical illnesses, head injury, trauma and burns. Counsel patients regarding the same.

(C) An intern must have observed or preferably assisted at the following operations/ procedures:

- a) Resuscitation of critical patients
- b) documentation medico legal cases
- c) management of bleeding and application of splints;

U 15.6.6: OBSTETRICS AND GYNAECOLOGY

GOAL:

The aim of teaching the undergraduate student in Obstetrics & Gynaecology is to impart such knowledge and skills that may enable him to diagnose and manage antenatal and post-natal follow up; manage labor and detect intrapartum emergencies; diagnose and treat common gynaecologic ailments.

(A) THERAPEUTIC- An intern must perform or assist in:

- a) Diagnosis of early pregnancy and provision of ante-natal care; antenatal pelvic assessment and detection of cephalopelvic disproportion,
- b) Diagnosis of pathology of pregnancy related to:
 - abortion
 - ectopic pregnancy
 - tumours complicating pregnancy
 - acute abdomen in early pregnancy
 - hyperemesis gravidarum,
- c) Detection of high risk pregnancy cases and give suitable advice e.g. PIH, hydramanios, antepartum haemorrhage, multiple pregnancies, abnormal presentations and intra-uterine growth retardation,
- d) Induction of labor and amniotomy under supervision,
- e) Induction of labor and amniotomy under supervision,
- f) Management of normal labor, detection of abnormalities, post-partum hemorrhage and repair of perennial tears,
- g) Assist in forceps delivery,
- h) Detection and management of abnormalities of lactation,
- i) Evaluation and prescription oral contraceptives with counseling,
- j) Per speculum, per vaginum and per rectal examination for detection of common congenital, inflammatory, neoplastic and traumatic conditions of vulva, vagina, uterus and ovaries,
- k) Medico-legal examination in Gynecology and Obstetrics.

(B) Skills that an intern should be able to perform under supervision:

- a) Dilatation and curettage and fractional curettage,
- b) Endometrial biopsy,
- c) Endometrial aspiration,
- d) Pap smear collection,
- e) Intra Uterine Contraceptive Device (IUCD) insertion,
- f) Minilap ligation,
- g) Urethral catheterization,
- h) Suture removal in postoperative cases,
- i) Cervical punch biopsy.

(C) An intern must have observed or preferably assisted at the following operations/ procedures:

- a) Major abdominal and vaginal surgery cases,
- b) Second trimester Medical Termination of Pregnancy (MTP) procedures. e.g. Emcredyl Prostaglandin instillations, Caesarean section.

U 15.6.7 OTORHINOLARYNGOLOGY (ENT)

GOAL:

The aim of teaching the undergraduate student in ophthalmology is to impart such knowledge and skills that may enable him to diagnose and treat common otorhinolaryngological conditions such as ear pain, foreign bodies and acquire ability for a comprehensive diagnosis of common Ear, Nose and Throat (ENT) diseases including emergencies and malignant neoplasms of the head and neck.

(A) THERAPEUTIC- An intern must perform or assist in:

- a) Ear syringing, antrum puncture and packing of the nose for epistaxis,
- b) Nasal douching and packing of the external canal,
- c) Removing foreign bodies from nose and ear,
- d) Observing or assisting in various endoscopic procedures and tracheostomy.

(B) Skill that an intern should be able to perform under supervision:

- a) Intern shall have participated as a team member in the diagnosis of various ENT- related diseases and be aware of National programme on prevention of deafness,
- b) Intern shall acquire knowledge of various ENT related rehabilitative programmes.

(C) An intern must have observed or preferably assisted at the following operations/ procedures:

- a) Intern shall acquire skills in the use of head mirror, otoscope and indirect laryngoscopy and first line of management of common Ear Nose and Throat (ENT) problems.

U 15.6.8 OPHTHALMOLOGY

GOAL:

The aim of teaching the undergraduate student in ophthalmology is to impart such knowledge and skills that may enable him to diagnose and treat common ophthalmological conditions such as Trauma, Acute conjunctivitis, allergic conjunctivitis, xerosis, entropion, corneal ulcer, iridocyclitis, myopia, hypermetropia, cataract, glaucoma, ocular injury and sudden loss of vision.

(A) THERAPEUTIC- An intern must perform or assist in:

- a) Subconjunctival injection
- b) Ocular bandaging
- c) Removal of concretions
- d) Epilation and electrolysis
- e) Corneal foreign body removal
- f) Cauterization of corneal ulcers
- g) Chalazion removal
- h) Entropion correction
- i) Suturing conjunctival tears
- j) Lids repair
- k) Glaucoma surgery (assisted)
- l) Enucleation of eye in cadaver.

(B) Skill that an intern should be able to perform under supervision:

- (a) Advise regarding methods for rehabilitation of the blind.

(C) An intern must have observed or preferably assisted at the following operations/ procedures:

- a) Assessment of refractive errors and advise its correction,
- b) Diagnose ocular changes in common systemic disorders,
- c) Perform investigative procedures such as tonometry, syringing, direct ophthalmoscopy, subjective refraction and fluorescein staining of cornea.

U 15.6.9 ORTHOPAEDICS

GOAL:

The aim of teaching the undergraduate student in Orthopaedics and Physical Medicine and Rehabilitation is to impart such knowledge and skills that may enable him to diagnose and treat common ailments. He/she shall have ability to diagnose and suspect presence of fracture, dislocation, actual osteomyelitis, acute poliomyelitis and common congenital deformities such as congenital talipes equinovarus (CTEV) and dislocation of hip (CDH).

(A) THERAPEUTIC- An intern must assist in:

- a) Splinting (plaster slab) for the purpose of emergency splint age, definitive splint age and post-operative splintage and application of Thomas splint,
- b) Manual reduction of common fractures – phalangeal, metacarpal, metatarsal and Colles' fracture,
- c) Manual reduction of common dislocations – interphalangeal, metacarpophalangeal, elbow and shoulder dislocations,
- d) Plaster cast application for undisplaced fractures of arm, fore arm, leg and ankle,
- e) Emergency care of a multiple injury patient,
- f) Transport and bed care of spinal cord injury patients.

(B) Skill that an intern should be able to perform under supervision:

- a) Advise about prognosis of poliomyelitis, cerebral palsy, CTEV and CDH,
- b) Advise about rehabilitation of amputees and mutilating traumatic and leprosy deformities of hand.

(C) An intern must have observed or preferably assisted at the following operations:

- a) Drainage for acute osteomyelitis,
- b) Sequestrectomy in chronic osteomyelitis,
- c) Application of external fixation,
- d) Internal fixation of fractures of long bones.

U 15.6.10 DERMATOLOGY VENEREOLOGY & LEPROSY

GOAL:

The aim of teaching the undergraduate student in Dermatology Venereology & Leprosy is to impart such knowledge and skills that may enable him to diagnose and treat common dermatological infections and leprosy. He/she shall acquire competence for clinical diagnosis based on history, physical examination and relevant laboratory investigations and institute appropriate line of management; this would include diseases common in tropics (parasitic, bacterial or viral infections, and cutaneous manifestations of systemic illnesses).

A. THERAPEUTIC- At the end of internship an intern must be able to:

- a) Conduct proper clinical examination; elicit and interpret physical findings, and diagnose common disorders and emergencies,
- b) Perform simple, routine investigative procedures for making bedside diagnosis, specially the examination of scraping for fungus, preparation of slit smears and staining for AFB for leprosy patient and for STD cases,
- c) Manage common diseases recognizing the need for referral for specialized care in case of inappropriateness of therapeutic response.

B. An intern must have observed or preferably assisted at the following operations/ procedures:

- a) Skin biopsy for diagnostic purpose

U 15.6.11 PSYCHIATRY

GOAL:

The aim of teaching the undergraduate student in Psychiatry is to impart such knowledge and skills that may enable him to diagnose and treat common psychiatric illnesses. He/she shall acquire competence for clinical diagnosis based on history, physical examination and relevant laboratory investigations and institute appropriate line of management. He/she should also be able to recognize the behavioural manifestations of systemic illnesses.

A. THERAPEUTIC- An intern must perform or assist in:

- a) Diagnose and manage common psychiatric disorders,
- b) Identify and manage psychological reactions,
- c) Diagnose and manage behavioural disorders in medical and surgical patients.

B. An intern must have observed or preferably assisted at the following operations/ procedures:

- a) ECT administration,
- b) Therapeutic counseling and follow-up.

U 15.6.12 RESPIRATORY MEDICINE

GOAL:

The aim of teaching the undergraduate student in Respiratory Medicine is to impart such knowledge and skills that may enable him to diagnose and treat common respiratory illnesses. He/she shall acquire competence for clinical diagnosis based on history, physical examination and relevant laboratory investigation and institute appropriate line of management.

A. THERAPEUTIC - An intern must perform or assist in:

THERAPEUTIC - An intern must perform or assist in:

- a) diagnosing and managing common respiratory disorders and emergencies,
- b) simple, routine investigative procedures required for making bed side diagnosis, especially sputum collection, examination for etiological organism like AFB, interpretation of chest X-rays and respiratory function tests,

c) interpreting and managing various blood gases and pH abnormalities in various illnesses.

B. An intern must have observed or preferably assisted at the following operations/ procedures:

- a) Laryngoscopy,
- b) Pleural aspiration, respiratory physiotherapy, laryngeal intubation and pneumo-thoracic drainage aspiration,
- c) Therapeutic counseling and follow up.

U 15.6.13 ANAESTHESIOLOGY

GOAL:

The aim of teaching the undergraduate student in anaesthesia is to impart such knowledge and skills that may enable him to understand principles of anaesthesia and recognize risk and complications of anaesthesia. At the end of internship, graduate should be able to perform cardio-pulmonary resuscitation correctly, including recognition of cardiac arrest.

(A) THERAPEUTIC- An intern must perform or assist in:

- a) Pre-anaesthetic checkup and prescribe pre-anaesthetic medications,
- b) Venepuncture and set up intravenous drip,
- c) Laryngoscopy and endotracheal intubation,
- d) Lumbar puncture, spinal anaesthesia and simple nerve blocks,
- e) Simple general anaesthetic procedures under supervision,
- f) Monitor patients during anaesthesia and in the post-operative period,
- g) Maintain anaesthetic records,
- h) Perform cardio-pulmonary resuscitation correctly, including recognition of cardiac arrest.

(B) Skill that an intern should be able to perform under supervision:

- a) Counseling and advise regarding various methods of anaesthesia,
- b) Recognise and manage problems associated with emergency anaesthesia,
- c) Recognise and treat complications in the post-operative period.

(C) An intern must have observed or preferably assisted at the following operations/ procedures:

- a) Anaesthesia for major and minor surgical and other procedures;

U 15.6.14 RADIODIAGNOSIS

GOAL:

The aim of teaching the undergraduate student in radiodiagnosis is to impart such knowledge and skills that may enable him to understand principles of imageology and recognize risk and complications of radiologic procedures and the need for protective techniques. At the end of internship, graduate should be able to counsel and prepare patients for various radiologic procedures.

An intern must acquire competency in:

- a) Identifying and diagnosing acute abdominal conditions clinically and choose appropriate imaging modality for diagnosis,
- b) Identifying and diagnosing acute traumatic conditions in bones and skull using X rays / CT Scans with emphasis on fractures and head injuries,
- c) Recognising basic hazards and precautions in radio-diagnostic practices specially related to pregnancy,
- d) Demonstrating awareness of the various laws like PC PNDT Act.

U 15.6.15 PHYSICAL MEDICINE AND REHABILITATION

GOAL:

The aim of teaching the undergraduate student in Physical Medicine & Rehabilitation is to impart such knowledge and skills that may enable him to diagnose and treat common rheumatologic, orthopedic and neurologic illnesses requiring physical treatment. He/she shall acquire competence for clinical diagnosis based

on history, physical examination and relevant laboratory investigations and institute appropriate line of management.

A. THERAPEUTIC- An intern must perform or assist in:

- a) Diagnosing and managing with competence clinical diagnosis and management based on detailed history and assessment of common disabling conditions like poliomyelitis, cerebralpalsy, hemiplegia, paraplegia, amputations etc.
- b) Participation as a team member in total rehabilitation including appropriate follow up of common disabling conditions,
- c) Procedures of fabrication and repair of artificial limbs and appliances.

B. An intern must have observed or preferably assisted at the following operations/ procedures:

- a) use of self-help devices and splints and mobility aids
- b) accessibility problems and home making for disabled
- c) simple exercise therapy in common conditions like prevention of deformity in polio, stump exercise in an amputee etc.
- d) Therapeutic counselling and follow up

U 15.6.16 FORENSIC MEDICINE AND TOXICOLOGY

GOAL:

The aim of teaching the undergraduate student in Forensic Medicine is to impart such knowledge and skills that may enable him to manage common medico-legal problems in day to day practice. He/she shall acquire competence for post mortem diagnosis based on history, physical examination and relevant observations during autopsy.

A. An intern must perform or assist in:

- a) Identifying and documenting medico-legal problems in a hospital and general practice,
- b) Identifying the medico-legal responsibilities of a medical man in various hospital situations,
- c) Diagnosing and managing with competence basic poisoning conditions in the community,
- d) Diagnosing and managing with competence and documentation in cases of sexual assault,

e) Preparing medico-legal reports in various medico legal situations.

B. An intern must have observed or preferably assisted at the following operations/ procedures, as given in Table 11:

a) Various medico legal / post-mortem procedures and formalities during their performance by police.

Table 11: Certifiable Procedural Skills:

A Comprehensive list of skills recommended as desirable for Bachelor of Medicine and Bachelor of Surgery

(MBBS) – Indian Medical Graduate

Specialty	Procedure
General Medicine	• Venipuncture (I) • Intramuscular injection(I) • Intradermal injection (D) • Subcutaneous injection(I) • Intra Venous (IV) injection (I) • Setting up IV infusion and calculating drip rate (I) • Blood transfusion (O) • Urinary catheterization (D) • Basic life support (D) • Oxygen therapy (I) • Aerosol therapy / nebulization (I) • Ryle's tube insertion (D) • Lumbar puncture (O) • Pleural and ascitic aspiration (O) • Cardiac resuscitation (D) • Peripheral blood smear interpretation (I) • Bedside urine analysis (D)
General Surgery	• Basic suturing (I) • Basic wound care (I)

	• Basic bandaging (I) • Incision and drainage of superficial abscess (I) • Early management of trauma (I) and trauma life support (D)
Orthopedics	• Application of basic splints and slings (I) • Basic fracture and dislocation management (O) • Compression bandage (I)
Gynecology	• Per Speculum (PS) and Per Vaginal (PV) examination (I) • Visual Inspection of Cervix with Acetic Acid (VIA) (O) • Pap Smear sample collection & interpretation (I) • Intra- Uterine Contraceptive Device (IUCD) insertion & removal (I)
Obstetrics	• Obstetric examination (I) • Episiotomy (I) • Normal labor and delivery (including partogram) (I)
Pediatrics	• Neonatal resuscitation (D) • Setting up Pediatric IV infusion and calculating drip rate (I) • Setting up Pediatric Intraosseous line (O)
Forensic Medicine	• Documentation and certification of trauma (I) • Diagnosis and certification of death (D) • Legal documentation related to emergency cases (D) • Certification of medical-legal cases e.g. Age estimation, sexual assault etc. (D) • Establishing communication in medico-legal cases with police, public health authorities, other concerned departments, etc (D)

Otorhinolaryngology	• Anterior nasal packing (D) • Otoscopy (I)
Ophthalmology	• Visual acuity testing (I) • Digital tonometry (D) • Indirect ophthalmoscopy (O) • Epilation (O) • Eye irrigation (I) • Instillation of eye medication (I) • Ocular bandaging (I)
Dermatology	• Slit skin smear for leprosy (O) • Skin biopsy (O) • Gram's stained smear interpretation(I) • KOH examination of scrapings for fungus (D) • Dark ground illumination (O) • Tissue smear (O) • Cautery - Chemical and electrical (O)

I- Independently performed on patients,

O- Observed in patients or on simulations,

D- Demonstration on patients or simulations and performance under supervision in patients

Certification of Skills: Any faculty member of concerned department can certify skills. For common procedures, the certifying faculty may be decided locally.

U 16. The Examination Manual

Regulations pertaining to ALL ASPECTS of the pre-examination, examination and post-examination processes are presented in detail in the RUAS Examination Manual. The following are some major issues covered in the RUAS Examination Manual. The RUAS Examination Manual is available on the University's Website.

1. Board of Examinations (BOE) and its Powers and Duties
2. Examination Calendar and Schedule
3. Registration of Candidates for Year-end or Supplementary Examinations
4. Eligibility of the Candidate to Write the University Examination
5. Conduct of Theory Examinations
6. Conduct of Practical Examinations/Clinical Examinations/Viva-Voce
7. Examination Timing and Bell Schedule
8. Vigilance Squads
9. Valuation Method
10. Result Review Boards
11. Rounding-off Policy
12. Grace Marks Policy
13. Calculation of Grade Point Average (GPA)
14. Misconduct and Malpractices in Examination
15. Examination Grievances and Redressal
16. Guidelines for using a Scribe in Written Examination
17. Guidelines for Retention and Disposal of Examination Process Documents and Records

U 17. Academic Awards

The University's Examination Manual contains the details of the regulations applicable to the following aspects of Academic Awards:

U 17.1 Announcement of Results

U 17.2 Re-evaluation of SEE

U 17.3 Withholding of Results

U 17.4 Statement of Learning and Achievement (Transcript/Marks Card)

U 17.5 Correction in the Transcript/Grade Card

U 17.6 Degree Certificate

U 17.7 Convocation

U 17.8 Donor awards during convocation

U 18. Migration

U 18.1 Student Migration

The applicant candidate shall be eligible to apply for migration only after qualifying in the first professional MBBS examination. Migration during clinical course of study shall not be allowed on any ground. Student migration will be governed by rules and regulations of NMC at the time of application for the same.

University Awards

The University may recognize meritorious performance of students by conferring various donor awards. These awards will be presented to students during the convocation.

Donor Awards

For the award of prizes and medals instituted by donors the conditions stipulated by the donors will be considered by the Board of Management.

Conduct and Discipline

The provision relating to discipline and code of conduct that applies to every member of the University is as described in Chapter 8 of the MSRUAS Statutes.

Any other issues not covered in this document will be referred to Academic Council. The decision of the Academic Council in such matters shall be final.

These Regulations may be amended from time to time by the Academic Council and approved by Board of Management.

Failure to read and understand the regulations is not an excuse.

MBBS Program outcomes:

MBBS graduate, on completion of program will demonstrate the following outcomes. Graduates will be able to:

1. demonstrate adequate critical skills in medical practice knowledge and enabling them to make valuable contributions to patients and health care as members of the health team.
2. Be competent physicians in the diagnosis and management of common health problems of the community and individuals of all age groups.
3. Communicate effectively both orally and in writing on treatment and management of a variety of health care issues.
4. Appreciate and understand the socio-psychological, cultural, economic and environmental factors affecting health.
5. Describe and demonstrate team work in management / leadership skills.

The program-specific objectives of the MBBS course are as follows:

- I. Clinician who understands and provides preventive, promotive, curative, palliative and holistic care with compassion and empathy.
- II. Leader and member of the health care team and system with capabilities to collect, plan, analyze, synthesize and communicate health data and management appropriately.
- III. Communicate with patients, families, colleagues, members of health team and community.
- IV. Lifelong learner committed to continuous improvement of skills and knowledge.
- V. Professional, who is committed to excellence, is ethical, professionally responsive and accountable to patients, community and profession.



Curriculum for Anatomy 2022



**Ramaiah Medical College
Ramaiah University of Applied
Sciences
Bengaluru-560054**

DEPARTMENT OF ANATOMY

Curriculum

Introduction to Department:

The Human anatomy forms the basis of all medical sciences. A knowledge of human anatomy is essential for the comprehension of the physiological, biochemical and pathological mechanisms. Hence, a detailed anatomy curriculum is required as a foundation upon which the normal as well as the abnormal structure and functions can be explained.

The Department of Anatomy with experienced and competent faculty enable the learning of the students through a robust activity-based curriculum. The department is well equipped with modern infrastructure such as brightly lit dissection hall and histology practical lab. The **dissection hall** is well spaced and designed for small groups of students to dissect and study human anatomy specimens. It is well ventilated with good exhaust mechanism. The **histology practical lab** is designed for individual activity and has a capacity to accommodate around 100 students. Two large TV monitors are installed for better visualization of microscopic diagrams. The lab also has wall mounted microscopic pictures of various tissues to facilitate student learning. The anatomy museum is a part of the Central museum to promote integrated learning activities.

The teaching faculty of Anatomy are qualified and competent. They are trained to impart quality education. The faculty have excelled in recent advances, research and innovative teaching methodology. The department also promotes student research program to inculcate the basic research methodology concepts.

One of the best practices of the institution-**Voluntary body Donation program** coordinated by the department, facilitates adequate cadaver resources for realistic visualization of human organ systems by the students.

This document provides the required guidelines to implement the CBME curriculum framed by National Medical Commission (NMC) for effective teaching-learning and evaluation of students.

Course Outcomes for Anatomy:

At the end of the course, the students should be able to

1. Describe the normal disposition, features, relations, functional & cross-sectional anatomy of upper & lower extremities, Head & Neck, thoracic and abdomino-pelvic organs including bones of the human body with their clinical relevance.
2. Identify structures of upper & lower extremities, Head & Neck, thoracic and abdomino-pelvic organs and bones of the human body and demonstrate their surface anatomy.
3. Identify and correlate microscopic structural organization of various tissues and organs with their important functions
4. Explain the principles & sequential development of the organ systems, the effects of common teratogens, genetic mutations & environmental hazards and developmental basis of various major congenital anomalies.
5. Identify the karyotype & phenotype of normal and chromosomal abnormalities.
6. Explain the principles of newer imaging techniques & interpretation of various features of normal human body in radiographs, CT, MRI scans and sonograms.
7. To demonstrate good attitude, ethical behaviour towards cadaver, fellow human beings and develop good communication skills.

Goal:

The main purpose of teaching anatomy is to enable the medical student with basic knowledge of various human anatomical structures and their relations to comprehend physiological mechanisms and correlate the anatomical basis with clinical conditions.

Objectives:

The student at the end of the course should be able to

Cognitive Domain:

- a) Describe the anatomy of the basic tissues of the human body.
- b) Enumerate the morphological features of various organs and relations with other structures.
- c) Explain the attachment of muscles, nerve supply and action.
- d) Describe the parts, relations and functions of the central nervous system.
- e) Describe the morphological features of bones of the human body and their attachments
- f) Explain the anatomical basis of various common clinical conditions and clinical procedures.
- g) Describe the microscopic features of general and systemic tissues of the human body.
- h) Describe the development of organ systems of the human body.
- i) Correlate the embryological basis of congenital anomalies/syndromes.

- j) Integrate the gross and microscopic anatomy with the physiological mechanisms and biochemical reactions of human organ systems.
- k) Describe the normal karyotype, abnormal chromosomal conditions, genetic mechanism of Inheritance, Inborn errors of metabolism, teratogenesis and mutations.
- l) Describe the prenatal diagnostic techniques, principles of genetic counseling and gene therapy.
- m) Describe the principles of radiography and the advanced radiological techniques.

Psychomotor Domain:

- n) Identify the gross anatomical features of organs.
- o) Demonstrate the morphological features of organs and relations.
- p) Demonstrate the surface marking of various organs and structures of the human body.
- q) Discuss the microscopy of general and systemic tissues.
- r) Identify the normal radiological and cross-sectional anatomy on Radiographs, Ultrasound, CT images and MRI.
- s) Identify the normal developmental processes and associated anomalous conditions in embryology models/charts

Affective Domain:

- a) Demonstrate humane behaviour with mutual respect for each other - personal and professional.
- b) Communicate effectively with teachers, technical staff, peers, patients during their learning activities.
- c) Develop punctuality in attending academic sessions, submissions of records and assignments.
- d) Demonstrate moral responsibility and accountability for their actions.
- e) Demonstrate honesty and integrity in all learning activities.
- f) Respect the cadaver as a teacher while handling the cadavers and specimens.
- g) Discuss the professional qualities of a physician of first contact and his/her responsibilities.

Teaching Learning Methods:

The university incorporates the guidelines of the CBME curriculum prescribed by the National Medical Commission (NMC). The department uses various innovative teaching learning methods to facilitate effective student learning.

Cognitive:

Sl. No.	T-L Method	Number of Hours
1	Interactive Lectures	220
2	Small Group Learning Tutorials Visit to hospital OPDs and Wards Problem based Learning for Integrated sessions Museum visits for integration Competitions/Seminars videos/role play/live/simulation	127
3	Early Clinical Exposure	30
4	Self-Directed Learning	40

Psychomotor and Affective Domain

Sl. No.	T-L Method	Number of Hours
1.	Dissection and Prosection (cadaver specimen) Demonstrations-videos/role play/live/simulation/Virtual Reality Slide demonstrations	288

Assessment methods:**Formative Assessment:**

The department follows the concept of continuous assessment for evaluating the students. The department of Anatomy will conduct **monthly tests, part completion test and three internal assessments. Fourth internal assessment will be conducted for improvement of scores as a remedial measure.**

This facilitates to give feedback to students on their learning. These tests allow regular and timely revision by the students. It also prepares the student to attend the summative examination with confidence.

Sl. No.	Assessment methods
1	Modified Long essay, Short Essay (SE),
2	Short answer questions (SAQ)
3	Multiple choice questions (MCQ)
4	Short Seminars
5	Spotters
6	Structured Discussions
7	Table viva (Gross Anatomy)
8	Objective Structured Practical Examination (OSPE)

Guidelines for Internal assessment:

- 1) The department will conduct a minimum of three internal assessments.
- 2) The **1st internal assessment** to include **one short essay** on **AETCOM modules 1.1 and 1.5**.
- 3) The **third internal assessment** will be as per university **summative examination**.
- 4) The marks obtained in the formative assessment should be displayed on the notice board within 1 -2 weeks after conducting the tests.

Theory:

- The theory paper will be conducted for 60 marks for 1st and 2nd IA and 100 marks for third IA
- Blue print guidelines to be followed for question paper setting.
- The distribution of marks will be as follows:
 - i. 40% of the subject questions will be based on clinical correlation and integration (LE, SE).
 - ii. 40% of the subject questions will and comprehension level of questions (SE).
 - iii. 20% of the subject questions will be of recall type. (SAQs and MCQs).
- Each **Internal assessment weightage** will be as follows:

Sl. No.	Topics	Weightage
1	Gross Anatomy (AETCOM -1 SE in 1 st IA)	65%
2	Histology	10%
3	Embryology	10%
4	Osteology/Genetics/General anatomy/recent advances.	15%

Scheme of Internal Assessment:

Sl. No.	Type of Question	Marks	Marks
1.	Long Essay	(2X10)=20	(2X10)=20
2.	Short Essay	(5X5) = 25	(10X5) = 50
3.	SAQs	(5X3) =15	(10X3) 30
4.	Total	60	100

Practical:

- The practical will be conducted for **60 marks**.
- **Scheme for practical assessment:**

Sl. No.	Assessment type	Marks
A Gross Anatomy		
1	Spotter Test (10X1)	10
2	Discussion (2X10)	20
B Histology		
1	Spotters (10 X1)	10
2	Discussion (2 X10)	20
Total		60

- The **histology record** and the **log book** should be evaluated on a continuous basis and certified by the department before the summative examination

The **pass criteria** in each internal assessment will be 40% separately in theory and practical. **Eligibility criteria** to take up summative examination, theory and practical cumulative should be 50%.

Regular monthly tests will be conducted in addition to the three internal assessments. These will be in the form of **SAQ test, MCQ test, SE test, Table viva, Spotter tests etc.**

These will be given weightage when considering internal assessment eligibility for summative examination.

LOG BOOK:

The anatomy log book should be completed and evaluated by the faculty on a timely basis. The same to be certified by the head of the department at the end of the program before summative examination.

HISTOLOGY RECORD:

The Histology record should be certified before each internal assessment and final certification by the head of the department before summative examination.

Eligibility for Summative Examination:**Weightage of various assessments as eligibility criteria for Summative exam:**

Sl. No.	Type of Assessment	Weightage
1.	Internal assessment	75% (70%)
2.	Monthly assessment (Part Completion test)	7% (12%)
3.	Professionalism	6%
4.	Histology records	6%
5.	Level of participation in ECE	6%

Sl. No.	Theory		Practical	
1	IA Theory	30	Gross and Histology	30
2	Monthly Assessments (Part completion Test)	5	Histology record	05
3	Professionalism	5	Level of participation in ECE	05
4	Total	40	Total	40

Another proposal

Formative assessment :			
Theory	30 Marks	Practical	30 Marks
Monthly Assessments - MCQs / SAQ tests / Viva voce etc.	05	Histology Practical records	05
Attitude	01	ECE Participation	05
Written Assignments	02		
Attendance	02 (for T + P attendance > 90%) 01 (for T + P attendance between 80-90%) Eligibility criteria for attendance is 80% (separately for theory & practical)		
Total	40		40

The eligibility is calculated by considering the internal assessment/monthly assessment and Professionalism and ethics (average should be 40% in theory and practical separately and 50% in theory and practical combined).

Attendance should be 75% in theory and 80% in practical, 75 % each for Foundation course and AETCOM.

If a student is found not to meet the criteria of eligibility for summative examination, remedial measures in the form of improvement tests/assignments should be given. The student can be allowed to take up summative examination if the remedial measures are fulfilled.

The internal assessment will appear as a separate subheading in the marks card and not be considered for pass criteria of final summative examination.

Summative Assessment:**Marks Distribution:**

Sl. No.	Theory	Practical	Viva	Total
Marks	200	80	20	300

Theory: 2 papers of 100 marks each.

The portions of theory paper I:

Upper limb, Thorax, Head and Neck, Neuroanatomy, General Anatomy. General embryology and relevant Systemic embryology. General histology and relevant Systemic histology.

The portions of theory paper II:

Abdomen and Pelvis, Lower Limb, relevant Systemic histology, relevant Systemic Embryology, Genetics

Pattern of Assessment:

Theory: Maximum marks: 200

Theory paper I &II

Sl. No.	Type of Question	Number	Marks
1	Long Essay	2 X 10	20
2	Short Essay	8 X 5	40
3	Short answer questions	10 X 3	30
4	MCQs	10 X 1	10
5	Total	30	100

Marks Distribution for the various topics in Paper I

Sl. No.	Region/Topic	Marks allotted (UL-LE) (Version-1)	Marks allotted (Thorax-LE) (Version -2)
1	Upper limb	18	23
2	Thorax	20	15
3	Head and Neck	23	23
4	Neuroanatomy	14	14
5	General Anatomy	7	7
6	General embryology and relevant systemic embryology.	9	9
7	General histology and relevant systemic histology	9	9
8	Total	100	100

Marks Distribution for the various topics in Paper II

Sl. No.	Region/Topic	Marks allotted (Abdomen -LE)	Marks allotted (Pelvis -LE)
1	Lower limb	21	21
2	Abdomen	24	29
3	Pelvis	22	17
4	Genetics	9	9
6	Relevant systemic embryology	12	12
7	Relevant systemic histology	12	12
8	Total	100	100

Practical: Maximum marks: 80

Sl. No.	Assessment type	Marks
Gross Anatomy		
1	Spotters (15X1)	15
2	Discussion	
	Above diaphragm (1X15)	15
	Below diaphragm(1X15)	15
3	Muscle testing	05
Histology		
1	Spotters (10X1)	10
2	Discussion	
	General(1X10)	10
	Systemic(1X10)	10
Total		80

Viva: Maximum marks: 20

Sl. No.	Viva Section	Marks
1	Osteology	05
2	Surface Anatomy	05
3	Embryology	05
4	Radiology	05
5	Total	20

Pass Criteria:

The student should secure **40% in each theory paper** and **50% of aggregate of the two papers**.

The student should secure 50% in **practical exam + viva**.

Supplementary Exam:

Supplementary exams to be conducted and results to be declared **within 60** days after announcement of results of main summative examination. If the student clears the supplementary exam he/she can join the regular batch.

Blue Print for Paper I

[illegible]

		histology										
15	SAQ 5	Neuroanatomy										
16	SAQ 6	Upper Limb										
17	SAQ 7	Head and Neck										
18	SAQ 8	Thorax										
19	SAQ 9	Upper Limb										
20	SAQ 10	Head and Neck										
21	MCQ 1	Head and Neck										
22	MCQ 2	Thorax										
23	MCQ 3	Upper Limb										
24	MCQ 4	Neuroanatomy										
25	MCQ 5	Thorax										
26	MCQ 6	Head and Neck										
27	MCQ 7	Upper Limb										
28	MCQ 8	General Anatomy										
29	MCQ 9	General Embryology/Relevant Systemic Embryology										
30	MCQ 10	General Histology/Relevant systemic histology										

**** If thorax is main question, the upper limb should be compensated in Short Essay, Same thing applies if upper limb is the main question.**

Blue Print for Paper II

[illegible]

20	SAQ 10	Relevant systemic histology										
21	MCQ 1	Lower Limb										
22	MCQ 2	Lower Limb										
23	MCQ 3	Lower Limb										
24	MCQ 4	Abdomen										
25	MCQ 5	Abdomen										
26	MCQ 6	Abdomen										
27	MCQ 7	Pelvis										
28	MCQ 8	Genetics										
29	MCQ 9	Relevant Systemic Histology										
30	MCQ 10	Relevant systemic histology										

**** If Abdomen is main question, the pelvis should be compensated in Short Essay, Same thing applies if pelvis is the main question.**

PRACTICAL PORTIONS

DISCUSSION TOPICS FOR MBBS PHASE-I

UPPER LIMB:

1. Structures under the cover of Pectoralis major muscle
2. Triangular & Quadrangular spaces
3. Axillary artery & branches
4. Structures under cover of deltoid muscle.
5. Flexor compartment of arm.
6. Brachial plexus in detail.
7. Brachial artery and branches.
8. Extensor compartment of arm.
9. Spiral/Radial groove – boundaries and contents in detail.
10. Shoulder joint.
11. Cubital fossa.
12. Flexor compartment of forearm-Muscles, vessels, nerves in detail.
13. Extensor compartment of forearm- “
14. Supinator and its relations.
15. Superficial palmar arch.
16. Deep palmar arch & deep branch of ulnar nerve.
17. Dorsum of hand.
18. Distribution of nerves in hand.
19. Flexor retinaculum of hand.
20. Extensor retinaculum of hand.

LOWER LIMB:

1. Femoral triangle.
2. Femoral sheath and contents.
3. Structures in front of thigh.
4. Adductor canal.
5. Structures under the cover of Gluteus maximus.
6. Sciatic nerve in detail.
7. Back of thigh.
8. Hamstring muscles.
9. Popliteal fossa
10. Anterior compartment of leg.
11. Peroneal compartment of leg.
12. Posterior compartment of leg.

13. Knee joint in detail.
14. Flexor, Extensor & peroneal retinacula of leg.
15. Dorsum of foot.
16. Sole (Layers, plantar arch)

DISCUSSION TOPICS ON THORAX

1. Typical intercostal space-Boundaries & contents in detail.
2. Lungs (right & left) in detail with pleura.
3. Hilum and Root of lungs.
4. Pericardium and external features of heart.
5. Sinuses of Pericardium.
6. Blood supply of heart.
7. Interior of atrial chambers of heart.
8. Interior of ventricular chambers of heart.
9. Superior mediastinum in detail.
10. Posterior mediastinum in detail.
11. Arch of aorta & its branches.

DISCUSSION TOPICS ON ABDOMEN AND PELVIS:

1. Rectus sheath and contents.
2. Inguinal canal.
3. Thoraco abdominal diaphragm.
4. Stomach.
5. Spleen.
6. Liver
7. Extra hepatic biliary apparatus (EHBA)
8. Duodenum
9. Pancreas.
10. Small intestine with mesentery.
11. Large intestine (colon, caecum and vermiform appendix).
12. Kidneys
13. Suprarenal glands.
14. Celiac trunk,
15. Superior mesenteric and inferior mesenteric vessels.
16. Urinary bladder.
17. Uterus
18. Fallopian tubes and ovaries.
19. Sections of the male pelvis (pelvic organs).

20. Sections of the female pelvis (pelvic organs).
21. Testis and spermatic cord.
22. Internal iliac artery and branches.
23. Posterior abdominal wall structures.

DISCUSSION TOPICS OF HEAD & NECK:

1. Scalp
2. Sensory nerve supply of face
3. Muscles of facial expression.
4. Facial vessels. (Facial artery + Facial vein).
5. Extra cranial course of facial nerve.
6. Parotid gland and relations.
7. Posterior triangle of neck
8. Deep cervical fascia.
9. Anterior triangles of Neck-Carotid and Digastric
10. Carotid sheath and contents
11. Thyroid gland
12. Midline structures of Neck
13. Carotid system of arteries and their branches (common external & internal)
14. Supra and infrahyoid muscles.
15. Submandibular Gland and relations
16. Relations of Hyoglossus
17. Nasal septum
18. Lateral wall of nose.
19. Tongue.
20. Pharynx
21. Larynx
22. Soft palate
23. Infra temporal fossa – boundaries and contents
24. Muscles of mastication.
25. Maxillary artery and branches.
26. Mandibular nerve and branches.
27. Interior of cranial cavity and identification of cranial nerves (Dural folds, dural venous sinuses)
28. Cavernous sinus and relations.

DISCUSSION TOPICS ON BRAIN

1. Sulci & Gyri of cerebral hemispheres. (Superolateral, medial & inferior surfaces)

2. Blood supply of brain.
3. Base of brain.
4. Median sagittal section of brain
5. White matter of cerebrum – corpus callosum
6. White matter of cerebrum – internal capsule
7. Lateral ventricles of Brain
8. Third ventricle of Brain
9. Fourth ventricle of Brain.
10. Horizontal section of brain at the level of I.V. Foramen.
11. Cerebellum.
12. Corpus callosum in detail.
13. Floor of 4th ventricle.
14. External features of Brain Stem
15. Blood supply of Brain Stem

MBBS PHASE 1 - HISTOLOGY SLIDES (DISCUSSION)

General Slides	
1	Collagen Fibre/Loose Areolar Tissue
2	Adipose Tissue
3	Hyaline Cartilage
4	White Fibro Cartilage
5	Elastic Cartilage
6	Bone.L.S
7	Bone.T.S
8	Skeletal Muscle.T.S
9	Skeletal Muscle.L.S
10	Cardiac Muscle
11	Peripheral Nerve.T.S
12	Elastic Artery
13	Muscular Artery
14	Vein
15	Serous Salivary Gland
16	Mucous Salivary Gland
17	Mixed Salivary Gland
18	Lymph Node
19	Thymus
20	Palatine Tonsil
21	Spleen
22	Spinal Ganglion
23	Sympathetic Ganglion
24	Thick Skin
25	Thin Skin
26	Placenta
27	Umbilical Cord
Systemic Slides	
28	Lacrimal Gland
29	Lip
30	Tongue-Filiform Papillae
31	Tongue-Circumvallate Papillae
32	Oesophagus
33	Stomach – Fundus
34	Stomach – Pylorus
35	Duodenum
36	Jejunum

37	Ileum
38	Colon
39	Appendix
40	Liver
41	Gall Bladder
42	Pancreas
43	Trachea
44	Lung
45	Mammary Gland
46	Kidney
47	Ureter
48	Urinary Bladder
49	Testis
50	Epididymis
51	Vas Deferens
52	Prostate
53	Ovary
54	Uterus
55	Fallopian Tube
56	Pituitary
57	Thyroid
58	Parathyroid
59	Suprarenal
60	Cornea
61	Retina
62	Eyelid
63	Optic Nerve
64	Spinal Cord
65	Cerebellum
66	Cerebrum

MBBS PHASE 1 - HISTOLOGY SLIDES (SPOTTERS)

<u>General Slides</u>	
1	Collagen Fibre/Loose Areolar Tissue
2	Adipose Tissue
3	Hyaline Cartilage
4	Elastic Cartilage
5	White Fibro Cartilage
6	Bone.L.S
7	Bone.T.S
8	Skeletal Muscle.T.S
9	Skeletal Muscle.L.S
10	Cardiac Muscle
11	Peripheral Nerve.T.S
12	Spinal Ganglion
13	Sympathetic Ganglion
14	Elastic Artery
15	Muscular Artery
16	Vein
17	Serous Salivary Gland
18	Mucous Salivary Gland
19	Mixed Salivary Gland
20	Lymph Node
21	Thymus
22	Palatine Tonsil
23	Spleen
24	Thick Skin
25	Thin Skin
26	Placenta
27	Umbilical Cord
<u>Systemic Slides</u>	
28	Lacrimal Gland
29	Lip
30	Tongue-Filiform Papillae
31	Tongue-Circumvallate Papillae
32	Oesophagus
33	Stomach – Fundus
34	Stomach – Pylorus
35	Duodenum
36	Jejunum

37	Ileum
38	Colon
39	Appendix
40	Liver
41	Gall Bladder
42	Pancreas
43	Trachea
44	Lung
45	Mammary Gland
46	Kidney
47	Ureter
48	Urinary Bladder
49	Testis
50	Epididymis
51	Vas Deferens
52	Prostate
53	Ovary
54	Uterus
55	Fallopian Tube
56	Pituitary
57	Thyroid
58	Parathyroid
59	Suprarenal
60	Cornea
61	Retina
62	Eyelid
63	Optic Nerve
64	Spinal Cord
65	Cerebellum
66	Cerebrum

SURFACE MARKING TOPICS FOR MBBS PHASE-I

UPPER LIMB:

1. Axillary artery
2. Brachial artery
3. Radial and ulnar artery
4. Superficial and deep palmar arch
5. Cephalic vein
6. Axillary vein
7. Radial nerve in the arm
8. Ulnar nerve
9. Median nerve
10. Extensor retinaculum
11. Flexor retinaculum

LOWER LIMB:

1. Long (great) saphenous vein
2. Femoral artery
3. Popliteal artery
4. Anterior tibial artery
5. Posterior tibial artery
6. Dorsalis pedis artery
7. Sciatic nerve
8. Tibial nerve
9. Deep peroneal nerve
10. Flexor retinaculum
11. Extensor retinaculum
12. Tibial collateral ligament
13. Mid inguinal point.

THORAX:

1. Internal thoracic (mammary) artery.
2. Ascending aorta, arch of aorta & descending thoracic aorta.
3. Superior vena cava.
4. Right & left brachiocephalic veins.
5. Thoracic duct.
6. Trachea with right & left principal bronchi.
7. Oesophagus.

8. Pleura- (Right & Left) - Anterior margin (C.M. line of reflection)
Inferior margin (C.D line of reflection)
Posterior margin
9. Lungs (Right & left)-Borders & fissures.
10. Heart-All borders.
11. Valves of heart.
12. Apex of heart.

ABDOMEN AND PELVIS:

1. Planes and quadrants, linea semilunaris.
2. Superficial inguinal ring, deep inguinal ring, inguinal canal.
3. Mid inguinal point and mid point of inguinal ligament.
4. Inguinal ligament
5. Stomach-Cardiac orifice, pyloric orifice, lesser curvature, greater curvature and whole stomach.
6. Liver.
7. Gall bladder (fundus).
8. Duodenum.
9. Pancreas.
10. Spleen.
11. Root of mesentery.
12. Iliocaecal orifice
13. Caecum
14. Vermiform appendix.
15. Mc.Burney's point
16. Morris parallelogram for kidneys.
17. Hilum of both kidneys.
18. Ureters
19. Abdominal aorta.
20. Coeliac trunk.
21. Superior and inferior mesenteric arteries.
22. Inferior vena cava.
23. Root of sigmoid Mesocolon.

HEAD & NECK:

BONY LANDMARKS: Bregma, Lambda, Nasion, Inion, Gonion, Glabella, Whitnall's tubercle, Pterion, Spine of 7th cervical Vertebra, Mastoid process, Head of mandible, Laryngeal prominence, Styloid process.

SURFACE MARKINGS:

1. Frontal sinus.
2. Facial artery and vein
3. Parotid gland and duct.
4. Thyroid gland
5. Middle meningeal artery
6. Spinal Accessory nerve.
7. Contents of carotid sheath-Carotid system of arteries, Internal jugular vein, Vagus nerve, Sympathetic chain.
8. Palatine tonsil.
9. External jugular vein.

BRAIN:

1. Central sulcus.
2. Lateral sulcus.
3. Superior sagittal sinus

RECOMMENDED LIST OF TEXTBOOKS:

General Anatomy

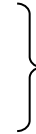
(1) Text book of General Anatomy by Vishram Singh

OR

(2) General Anatomy by B.D.Chaurasia (by CBS Publishers)

Gross Anatomy

- 1) Anatomy of Upper Limb & Thorax (Vol I)
- 2) Anatomy of Lower Limb & Abdomen (Vol II)
- 3) Anatomy of Head & Neck (Vol III)
- 4) Anatomy of Brain (Neuroanatomy) (Vol IV)



By B.D.Chaurasia

OR

- 1) Anatomy of Upper Limb & Thorax (Vol I)
- 2) Anatomy of Lower Limb & Abdomen (Vol II)
- 3) Anatomy of Head, Neck
- 4) Text book of Clinical Neuroanatomy



By Vishram Singh

(2) ATLAS OF GROSS ANATOMY: (for Practicals)

Netter Atlas of Human Anatomy

OR

Grants Atlas of Human Anatomy

Histology

Textbook of Human Histology (with color atlas) – By Yogesh Sontakke

OR

Text book of Histology – By I.B.Singh

diFiore's Atlas of Histology with functional correlations

Embryology

Textbook of Human Embryology – By Yogesh Sontakke

OR

Human Embryology – By Inderbir Singh

Clinical Anatomy

Snell's Clinical Anatomy

Keith and Moore's Clinical anatomy

Genetics:

Principals of Clinical Genetics – By Yogesh Sontakke

OR

Essentials of Genetics – By Renu Chauhan

Other books

1. Selective anatomy – preparatory manual for undergraduates By Vishram singh (A Guide)
– Vol. 1 & 2
2. Companion 10 years Question Bank of RGUHS Exams – By Singhi Yatiraj
3. Oxford's New Medical Dictionary (CBS)

FORMAT FOR ASSESSING PROFESSIONALISM

Sl. No.	Overall attendance (5)	Timely submission of record books /assignments (5)	Behaves respectfully with peers and teachers (5)
1			
2			
3			

Signature of Faculty mentor

Signature of HOD

Guidelines for assessment:

Attendance

Grade	Percentage
5	95-100%
4	90-94%
3	85-89%
2	80-84%
1	< 80%

Submission of record books /assignments

Grade	Criteria
5	Always submits the record/assignments on time
4	Often submits the record/assignments on time
3	Frequently submits the record/assignments on time
2	Rarely submits the record on time
1	Has not submitted at all

Behaves respectfully with peers and teachers

Grade	Criteria

5	Demonstrates appropriate respectful behavior with peers and teachers always
4	Demonstrates appropriate respectful behavior with peers and teachers most of the time
3	Demonstrates appropriate respectful behavior with peers and teachers frequently
2	Demonstrates appropriate respectful behavior with peers and teachers rarely
1	Is arrogant and disrespectful to peers and teachers

Format for assessing participation in ECE sessions

Name of the Student:

Date:

ECE session

5-Strongly agree 4-Agree 3 Not sure 2 Disagree 1-Strongly disagree

Sl. No.	Criteria	5	4	3	2	1
1	Critical Appraisal					
a	Clarifies, defines and analyses the problem from the scenario / interaction with patient					
b	Identifies learning objectives					
c	Demonstrates initiative and curiosity					
2	Utilization of learning resources					
a	Utilizes relevant resource materials effectively					
b	Applies knowledge to new situations to solve problems and to reach decisions					
3	Group work					
a	Organized and prepared for small group sessions					
b	Shares thoughts and opinions with peers actively					
4	Attitudes and Communication Skills					
a	The oral expression is clear enough to be understood					
b	Provides and accepts constructive feedback					
c	Contributes to group harmony (listens to conflicting opinions and tolerates shortcomings of others)					

SYLLABUS

Competencies in Anatomy				
No.	Topic	Competencies	Core	Non-Core
1	General Anatomy	35	22	13
2	Gross Anatomy			
a	Upper Limb	48	41	7
b	Thorax	29	25	4
c	Head and neck	68	44	24
d	Neuroanatomy	28	24	4
e	Abdomen	33	19	14
f	Pelvis	13	8	5
g	Lower Limb	32	22	10
3	Histology			
a	General Histology	19	15	4

b	Systemic Histology	07	06	01
4	Embryology			
a	General Embryology	27	23	4
b	Systemic Embryology	16	10	06
5	Osteology	23	17	06
6	Genetics	15	11	4
7	Surface Anatomy	11	9	02
8	Radiology	9	5	4
9	Cross Sectional Anatomy	2	2	0
TOTAL		409	303	106

General Anatomy

Sl. No.	Competency number	Competency
1	AN1.1	Demonstrate normal anatomical position, various planes, relation, comparison, laterality & movement in our body
2	AN1.2	Describe composition of bone and bone marrow
3	AN2.1	Describe parts, blood and nerve supply of a long bone
4	AN2.2	Enumerate laws of ossification
5	AN2.3	Enumerate special features of a sesamoid bone
6	AN2.4	Describe various types of cartilage with its structure & distribution in body
7	AN2.5	Describe various joints with subtypes and examples
8	AN2.6	Explain the concept of nerve supply of joints & Hilton's law
9	AN3.1	Classify muscle tissue according to structure & action
10	AN3.2	Enumerate parts of skeletal muscle and differentiate between tendons and aponeuroses with examples
11	AN3.3	Explain Shunt and spurt muscles
12	AN4.1	Describe different types of skin & dermatomes in body
13	AN4.2	Describe structure & function of skin with its appendages
14	AN4.3	Describe superficial fascia along with fat distribution in body
15	AN4.4	Describe modifications of deep fascia with its functions
16	AN4.5	Explain principles of skin incisions
17	AN5.1	Differentiate between blood vascular and lymphatic system
18	AN5.2	Differentiate between pulmonary and systemic circulation
19	AN5.3	List general differences between arteries & veins
20	AN5.4	Explain functional difference between elastic, muscular arteries and arterioles
21	AN5.5	Describe portal system giving examples
22	AN5.6	Describe the concept of anastomoses and collateral circulation with significance of end-arteries

23	AN5.7	Explain function of meta-arterioles, precapillary sphincters, arterio-venous anastomoses
24	AN5.8	Define thrombosis, infarction & aneurysm
25	AN6.1	List the components and functions of the lymphatic system
26	AN6.2	Describe structure of lymph capillaries & mechanism of lymph circulation
27	AN6.3	Explain the concept of lymphoedema and spread of tumors via lymphatics and venous system
28	AN7.1	Describe general plan of nervous system with components of central, peripheral & autonomic nervous systems
29	AN7.2	List components of nervous tissue and their functions
30	AN7.3	Describe parts of a neuron and classify them based on number of neurites, size & function
31	AN7.4	Describe structure of a typical spinal nerve
32	AN7.5	Describe principles of sensory and motor innervation of muscles
33	AN7.6	Describe concept of loss of innervation of a muscle with its applied anatomy
34	AN7.7	Describe various type of synapse
35	AN7.8	Describe differences between sympathetic and spinal ganglia

Gross Anatomy-Upper Limb

Sl. No.	Competency number	Competency
1	AN9.1	Describe attachment, nerve supply & action of pectoralis major and pectoralis minor
2	AN9.2	Breast: Describe the location, extent, deep relations, structure, age changes, blood supply, lymphatic drainage, microanatomy and applied anatomy of breast
3	AN10.1	Identify & describe boundaries and contents of axilla
4	AN10.2	Identify, describe and demonstrate the origin, extent, course, parts, relations and branches of axillary artery & tributaries of vein
5	AN10.3	Describe, identify and demonstrate formation, branches, relations, area of supply of branches, course and relations of terminal branches of brachial plexus
6	AN10.4	Describe the anatomical groups of axillary lymph nodes and specify their areas of drainage
7	AN10.5	Explain variations in formation of brachial plexus
8	AN10.6	Explain the anatomical basis of clinical features of Erb's palsy and Klumpke's paralysis
9	AN10.7	Explain anatomical basis of enlarged axillary lymph nodes
10	AN10.8	Describe, identify and demonstrate the position, attachment, nerve supply and actions of trapezius and latissimus dorsi
11	AN10.9	Describe the arterial anastomosis around the scapula and mention the boundaries of triangle of auscultation
12	AN10.10	Describe and identify the deltoid and rotator cuff muscles
13	AN10.11	Describe & demonstrate attachment of serratus anterior with its action
14	AN10.12	Describe and demonstrate shoulder joint for– type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements, muscles involved, blood supply, nerve supply and applied anatomy
15	AN10.13	Explain anatomical basis of Injury to axillary nerve during intramuscular injections
16	AN11.1	Describe and demonstrate muscle groups of upper arm with emphasis on biceps and triceps brachii

17	AN11.2	Identify & describe origin, course, relations, branches (or tributaries), termination of important nerves and vessels in arm
18	AN11.3	Describe the anatomical basis of Venepuncture of cubital veins
19	AN11.4	Describe the anatomical basis of Saturday night paralysis
20	AN11.5	Identify & describe boundaries and contents of cubital fossa
21	AN11.6	Describe the anastomosis around the elbow joint
22	AN12.1	Describe and demonstrate important muscle groups of ventral forearm with attachments, nerve supply and actions
23	AN12.2	Identify & describe origin, course, relations, branches (or tributaries), termination of important nerves and vessels of forearm
24	AN12.3	Identify & describe flexor retinaculum with its attachments
25	AN12.4	Explain anatomical basis of carpal tunnel syndrome
26	AN12.5	Identify & describe small muscles of hand. Also describe movements of thumb and muscles involved
27	AN12.6	Describe & demonstrate movements of thumb and muscles involved
28	AN12.7	Identify & describe course and branches of important blood vessels and nerves in hand
29	AN12.8	Describe anatomical basis of Claw hand
30	AN12.9	Identify & describe fibrous flexor sheaths, ulnar bursa, radial bursa and digital synovial sheaths
31	AN12.10	Explain infection of fascial spaces of palm
32	AN12.11	Identify, describe and demonstrate important muscle groups of dorsal forearm with attachments, nerve supply and actions
33	AN12.12	Identify & describe origin, course, relations, branches (or tributaries), termination of important nerves and vessels of back of forearm
34	AN12.13	Describe the anatomical basis of Wrist drop
35	AN12.14	Identify & describe compartments deep to extensor retinaculum
36	AN12.15	Identify & describe extensor expansion formation
37	AN13.1	Describe and explain Fascia of upper limb and compartments, veins of

		upper limb and its lymphatic drainage
38	AN13.2	Describe dermatomes of upper limb
39	AN13.3	Identify & describe the type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements, blood and nerve supply of elbow joint, proximal and distal radio-ulnar joints, wrist joint & first carpometacarpal joint
40	AN13.4	Describe Sternoclavicular joint, Acromioclavicular joint, Carpometacarpal joints & Metacarpophalangeal joint

Gross Anatomy- Lower Limb

Sl. No.	Competency number	Competency
1	AN14.1	Identify the given bone, its side, important features & keep it in anatomical position
2	AN14.2	Identify & describe joints formed by the given bone
3	AN14.3	Describe the importance of ossification of lower end of femur & upper end of tibia
4	AN14.4	Identify and name various bones in the articulated foot with individual muscle attachment
5	AN15.1	Describe and demonstrate origin, course, relations, branches (or tributaries), termination of important nerves and vessels of anterior thigh
6	AN15.2	Describe and demonstrate major muscles with their attachment, nerve supply and actions
7	AN15.3	Describe and demonstrate boundaries, floor, roof and contents of femoral triangle
8	AN15.4	Explain anatomical basis of Psoas abscess & Femoral hernia
9	AN15.5	Describe and demonstrate adductor canal with its content
10	AN16.1	Describe and demonstrate origin, course, relations, branches (or tributaries), termination of important nerves and vessels of gluteal region
11	AN16.2	Describe anatomical basis of sciatic nerve injury during gluteal intramuscular injections
12	AN16.3	Explain the anatomical basis of Trendelenburg sign
13	AN16.4	Describe and demonstrate the hamstrings group of muscles with their attachment, nerve supply and actions
14	AN16.5	Describe and demonstrate the origin, course, relations, branches (or tributaries), termination of important nerves and vessels on the back of thigh
15	AN16.6	Describe and demonstrate the boundaries, roof, floor, contents and relations of popliteal fossa
16	AN17.1	Describe and demonstrate the type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood and

		nerve supply, bursae around the hip joint
17	AN17.2	Describe anatomical basis of complications of fracture neck of femur
18	AN17.3	Describe dislocation of hip joint and surgical hip replacement
19	AN18.1	Describe and demonstrate major muscles of anterior compartment of leg with their attachment, nerve supply and actions
20	AN18.2	Describe and demonstrate origin, course, relations, branches (or tributaries), termination of important nerves and vessels of anterior compartment of leg
21	AN18.3	Explain the anatomical basis of foot drop
22	AN18.4	Describe and demonstrate the type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood and nerve supply, bursae around the knee joint
23	AN18.5	Explain the anatomical basis of locking and unlocking of the knee joint
24	AN18.6	Describe knee joint injuries with its applied anatomy
25	AN18.7	Explain anatomical basis of Osteoarthritis
26	AN19.1	Describe and demonstrate the major muscles of back of leg with their attachment, nerve supply and actions
27	AN19.2	Describe and demonstrate the origin, course, relations, branches (or tributaries), termination of important nerves and vessels of back of leg
28	AN19.3	Explain the concept of “Peripheral heart”
29	AN19.4	Explain the anatomical basis of rupture of calcaneal tendon
30	AN19.5	Describe factors maintaining importance arches of the foot with its importance
31	AN19.6	Explain the anatomical basis of Flat foot & Club foot
32	AN19.7	Explain the anatomical basis of Metatarsalgia & Plantar fasciitis
33	AN20.1	Describe and demonstrate the type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements and muscles involved, blood and nerve supply of tibiofibular and ankle joint
34	AN20.2	Describe the subtalar and transverse tarsal joints
35	AN20.3	Describe and demonstrate Fascia lata, Venous drainage, Lymphatic drainage, Retinacula & Dermatomes of lower limb

36	AN20.4	Explain anatomical basis of enlarged inguinal lymph nodes
37	AN20.5	Explain anatomical basis of varicose veins and deep vein thrombosis

Gross Anatomy - Thorax

Sl. No.	Competency number	Competency
1	AN21.3	Describe & demonstrate the boundaries of thoracic inlet, cavity and outlet
2	AN21.4	Describe & demonstrate extent, attachments, direction of fibres, nervesupply and actions of intercostal muscles
3	AN21.5	Describe & demonstrate origin, course, relations and branches of a typical intercostal nerve
4	AN21.6	Mention origin, course and branches/ tributaries of: 1) anterior & posterior intercostal vesselsinternal thoracic vessels
5	AN21.7	Mention the origin, course, relations and branches of 1) atypical intercostal nervesuperior intercostal artery, subcostal artery
6	AN21.8	Describe & demonstrate type, articular surfaces & movements of manubriosternal, costovertebral, costotransverse and xiphisternal joints
7	AN21.9	Describe & demonstrate mechanics and types of respiration
8	AN21.10	Describe costochondral and interchondral joints
9	AN21.11	Mention boundaries and contents of the superior, anterior, middle and posterior mediastinum
10	AN22.1	Describe & demonstrate subdivisions, sinuses in pericardium, blood supplyand nerve supply of pericardium
11	AN22.2	Describe & demonstrate external and internal features of each chamber ofheart
12	AN22.3	Describe & demonstrate origin, course and branches of coronary arteries
13	AN22.4	Describe anatomical basis of ischaemic heart disease
14	AN22.5	Describe & demonstrate the formation, course, tributaries and terminationof coronary sinus
15	AN22.6	Describe the fibrous skeleton of heart
16	AN22.7	Mention the parts, position and arterial supply of the conducting system ofheart
17	AN23.1	Describe & demonstrate the external appearance, relations, blood supply,nerve supply,lymphatic drainage and applied anatomy of oesophagus
18	AN23.2	Describe & demonstrate the extent, relations tributaries of thoracic ductand enumerate its applied anatomy

19	AN23.3	Describe & demonstrate origin, course, relations, tributaries and termination of superior venacava, azygos, hemiazygos and accessory hemiazygos veins
20	AN23.4	Mention the extent, branches and relations of arch of aorta & descending thoracic aorta
21	AN23.5	Identify & Mention the location and extent of thoracic sympathetic chain
22	AN23.6	Describe the splanchnic nerves
23	AN23.7	Mention the extent, relations and applied anatomy of lymphatic duct
24	AN24.1	Mention the blood supply, lymphatic drainage and nerve supply of pleura, extent of pleura and describe the pleural recesses and their applied anatomy
25	AN24.2	Identify side, external features and relations of structures which form root of lung & bronchial tree and their clinical correlate
26	AN24.3	Describe a bronchopulmonary segment
27	AN24.4	Identify phrenic nerve & describe its formation & distribution
28	AN24.5	Mention the blood supply, lymphatic drainage and nerve supply of lungs
29	AN24.6	Describe the extent, length, relations, blood supply, lymphatic drainage and nerve supply of trachea

Gross Anatomy- Head and Neck

Sl. No.	Competency number	Competency
1	AN27.1	Describe the layers of scalp, its blood supply, its nerve supply and surgical importance
2	AN27.2	Describe emissary veins with its role in spread of infection from extracranial route to intracranial venous sinuses
3	AN28.1	Describe & demonstrate muscles of facial expression and their nervesupply
4	AN28.2	Describe sensory innervation of face
5	AN28.3	Describe & demonstrate origin /formation, course, branches /tributaries offacial vessels
6	AN28.4	Describe & demonstrate branches of facial nerve with distribution
7	AN28.5	Describe cervical lymph nodes and lymphatic drainage of head, face andneck
8	AN28.6	Identify superficial muscles of face, their nerve supply and actions
9	AN28.7	Explain the anatomical basis of facial nerve palsy
10	AN28.8	Explain surgical importance of deep facial vein
11	AN28.9	Describe & demonstrate the parts, borders, surfaces, contents, relationsand nerve supply of parotid gland with course of its duct and surgical importance
12	AN28.10	Explain the anatomical basis of Frey's syndrome
13	AN29.1	Describe & demonstrate attachments, nerve supply, relations and actionsof sternocleidomastoid
14	AN29.2	Explain anatomical basis of Erb's & Klumpke's palsy
15	AN29.3	Explain anatomical basis of wry neck
16	AN29.4	Describe & demonstrate attachments of 1) inferior belly of omohyoid,2)scalenus anterior, 3) scalenus medius & 4) levator scapulae
17	AN30.1	Describe the cranial fossae & identify related structures
18	AN30.2	Describe & identify major foramina with structures passing through them
19	AN30.3	Describe & identify dural folds & dural venous sinuses
20	AN30.4	Describe clinical importance of dural venous sinuses

21	AN30.5	Explain effect of pituitary tumours on visual pathway
22	AN31.1	Describe & identify extra ocular muscles of eyeball
23	AN31.2	Describe & demonstrate nerves and vessels in the orbit
24	AN31.3	Describe anatomical basis of Horner's syndrome
25	AN31.4	Enumerate components of lacrimal apparatus
26	AN31.5	Explain the anatomical basis of oculomotor, trochlear and abducent nerve palsies along with strabismus
27	AN32.1	Describe boundaries and subdivisions of anterior triangle
28	AN32.2	Describe & demonstrate boundaries and contents of muscular, carotid, digastric and submental triangles
29	AN33.1	Describe & demonstrate extent, boundaries and contents of temporal and infratemporal fossae
30	AN33.2	Describe & demonstrate attachments, direction of fibres, nerve supply and actions of muscles of mastication
31	AN33.3	Describe & demonstrate articulating surface, type & movements of temporomandibular joint
32	AN33.4	Explain the clinical significance of pterygoid venous plexus
33	AN33.5	Describe the features of dislocation of temporomandibular joint
34	AN34.1	Describe & demonstrate the morphology, relations and nerve supply of submandibular salivary gland & submandibular ganglion
35	AN34.2	Describe the basis of formation of submandibular stones
36	AN35.1	Describe the parts, extent, attachments, modifications of deep cervical fascia
37	AN35.2	Describe & demonstrate location, parts, borders, surfaces, relations & blood supply of thyroid gland
38	AN35.3	Demonstrate & describe the origin, parts, course & branches subclavian artery
39	AN35.4	Describe & demonstrate origin, course, relations, tributaries and termination of internal jugular & brachiocephalic veins
40	AN35.5	Describe and demonstrate extent, drainage & applied anatomy of cervical lymph nodes

41	AN35.6	Describe and demonstrate the extent, formation, relation & branches of cervical sympathetic chain
42	AN35.7	Describe the course and branches of IX, X, XI & XII nerve in the neck
43	AN35.8	Describe the anatomically relevant clinical features of Thyroid swellings
44	AN35.9	Describe the clinical features of compression of subclavian artery and lower trunk of brachial plexus by cervical rib
45	AN35.10	Describe the fascial spaces of neck
46	AN36.1	Describe the 1) morphology, relations, blood supply and applied anatomy of palatine tonsil 2) composition of soft palate
47	AN36.2	Describe the components and functions of Waldeyer's lymphatic ring
48	AN36.3	Describe the boundaries and clinical significance of pyriform fossa
49	AN36.4	Describe the anatomical basis of tonsillitis, tonsillectomy, adenoids and peritonsillar abscess
50	AN36.5	Describe the clinical significance of Killian's dehiscence
51	AN37.1	Describe & demonstrate features of nasal septum, lateral wall of nose, their blood supply and nerve supply
52	AN37.2	Describe location and functional anatomy of paranasal sinuses
53	AN37.3	Describe anatomical basis of sinusitis & maxillary sinus tumours
54	AN38.1	Describe the morphology, identify structure of the wall, nerve supply, blood supply and actions of intrinsic and extrinsic muscles of the larynx
55	AN38.2	Describe the anatomical aspects of laryngitis
56	AN38.3	Describe anatomical basis of recurrent laryngeal nerve injury
57	AN39.1	Describe & demonstrate the morphology, nerve supply, embryological basis of nerve supply, blood supply, lymphatic drainage and actions of extrinsic and intrinsic muscles of tongue
58	AN39.2	Explain the anatomical basis of hypoglossal nerve palsy
59	AN40.1	Describe & identify the parts, blood supply and nerve supply of external ear
60	AN40.2	Describe & demonstrate the boundaries, contents, relations and functional anatomy of middle ear and auditory tube

61	AN40.3	Describe the features of internal ear
62	AN40.4	Explain anatomical basis of otitis externa and otitis media
63	AN40.5	Explain anatomical basis of myringotomy
64	AN41.1	Describe & demonstrate parts and layers of eyeball
65	AN41.2	Describe the anatomical aspects of cataract, glaucoma & central retinal artery occlusion
66	AN41.3	Describe the position, nerve supply and actions of intraocular muscles
67	AN42.1	Describe the contents of the vertebral canal
68	AN42.2	Describe & demonstrate the boundaries and contents of Suboccipital triangle
69	AN42.3	Describe the position, direction of fibres, relations, nerve supply, actions of semispinalis capitis and splenius capitis
70	AN43.1	Describe & demonstrate the movements with muscles producing the movements of atlantooccipital joint & atlantoaxial joint

Neuroanatomy

Sl. No.	Competency number	Competency
1	AN 56.1	Describe & identify various layers of meninges with its extent & modifications
2	AN 56.2	Describe circulation of CSF with its applied anatomy
3	AN 57.1	Identify external features of spinal cord
4	AN 57.2	Describe extent of spinal cord in child & adult with its clinical implication
5	AN 57.3	Draw & label transverse section of spinal cord at mid-cervical & midthoracic level
6	AN 57.4	Enumerate ascending & descending tracts at mid thoracic level of spinal cord
7	AN 57.5	Describe anatomical basis of syringomyelia
8	AN 58.1	Identify external features of medulla oblongata
9	AN 58.2	Describe transverse section of medulla oblongata at the level of 1) pyramidal decussation, 2) sensory decussation 3) ION
10	AN 58.3	Enumerate cranial nerve nuclei in medulla oblongata with their functional group
11	AN 58.4	Describe anatomical basis & effects of medial & lateral medullary syndrome
12	AN 59.1	Identify external features of pons
13	AN 59.2	Draw & label transverse section of pons at the upper and lower level
14	AN 59.3	Enumerate cranial nerve nuclei in pons with their functional group
15	AN 60.1	Describe & demonstrate external & internal features of cerebellum
16	AN 60.2	Describe connections of cerebellar cortex and intracerebellar nuclei
17	AN 60.3	Describe anatomical basis of cerebellar dysfunction
18	AN 61.1	Identify external & internal features of midbrain
19	AN 61.2	Describe internal features of midbrain at the level of superior & inferior colliculus
20	AN 61.3	Describe anatomical basis & effects of Benedikt's and Weber's syndrome
21	AN 62.1	Enumerate cranial nerve nuclei with its functional component
22	AN 62.2	Describe & demonstrate surfaces, sulci, gyri, poles, & functional areas of cerebral hemisphere

23	AN 62.3	Describe the white matter of cerebrum
24	AN 62.4	Enumerate parts & major connections of basal ganglia & limbic lobe
25	AN 62.5	Describe boundaries, parts, gross relations, major nuclei and connections of dorsal thalamus, hypothalamus, epithalamus, metathalamus and subthalamus
26	AN 62.6	Describe & identify formation, branches & major areas of distribution of circle of Willis
27	AN 63.1	Describe & demonstrate parts, boundaries & features of IIIrd, IVth & lateral ventricle
28	AN 63.2	Describe anatomical basis of congenital hydrocephalus

Gross Anatomy-Abdomen

Sl. No.	Competency number	Competency
1	AN44.1	Describe & demonstrate the Planes (transpyloric, transtubercular, subcostal, lateral vertical, linea alba, linea semilunaris), regions & Quadrants of abdomen
2	AN44.2	Describe & identify the Fascia, nerves & blood vessels of anteriorabdominal wall
3	AN44.3	Describe the formation of rectus sheath and its contents
4	AN44.4	Describe & demonstrate extent, boundaries, contents of Inguinal canalincluding Hesselbach's triangle.
5	AN44.5	Explain the anatomical basis of inguinal hernia.
6	AN44.6	Describe & demonstrate attachments of muscles of anterior abdominalwall
7	AN44.7	Enumerate common Abdominal incisions
8	AN45.1	Describe Thoracolumbar fascia
9	AN45.2	Describe & demonstrate Lumbar plexus for its root value, formation & branches
10	AN45.3	Mention the major subgroups of back muscles, nerve supply and action
11	AN46.1	Describe & demonstrate coverings, internal structure, side determination, blood supply, nerve supply, lymphatic drainage & descent of testis with its applied anatomy
12	AN46.2	Describe parts of Epididymis
13	AN46.3	Describe Penis under following headings: (parts, components, bloodsupply and lymphatic drainage)
14	AN46.4	Explain the anatomical basis of Varicocoele
15	AN46.5	Explain the anatomical basis of Phimosis & Circumcision
16	AN47.1	Describe & identify boundaries and recesses of Lesser & Greater sac
17	AN47.2	Name & identify various peritoneal folds & pouches with its explanation
18	AN47.3	Explain anatomical basis of Ascites & Peritonitis
19	AN47.4	Explain anatomical basis of Subphrenic abscess
20	AN47.5	Describe & demonstrate major viscera of abdomen under following headings (anatomical position, external and internal features, important

		peritoneal and other relations, blood supply, nerve supply, lymphatic drainage and applied aspects)
21	AN47.6	Explain the anatomical basis of Splenic notch, Accessory spleens, Kehr's sign, Different types of vagotomy, Liver biopsy (site of needle puncture), Referred pain in cholecystitis, Obstructive jaundice, Referred pain aroundumbilicus, Radiating pain of kidney to groin & Lymphatic spread in carcinoma stomach
22	AN47.7	Mention the clinical importance of Calot's triangle
23	AN47.8	Describe & identify the formation, course relations and tributaries of Portalvein, Inferior vena cava & Renal vein
24	AN47.9	Describe & identify the origin, course, important relations and branches of Abdominal aorta, Coeliac trunk, Superior mesenteric, Inferior mesenteric & Common iliac artery
25	AN47.10	Enumerate the sites of portosystemic anastomosis
26	AN47.11	Explain the anatomic basis of hematemesis& caput medusae in portal hypertension
27	AN47.12	Describe important nerve plexuses of posterior abdominal wall
28	AN47.13	Describe & demonstrate the attachments, openings, nerve supply & actionof the thoracoabdominal diaphragm
29	AN47.14	Describe the abnormal openings of thoracoabdominal diaphragm and diaphragmatic hernia

Gross Anatomy-Pelvis

Sl. No.	Competency number	Competency
1	AN48.1	Describe & identify the muscles of Pelvic diaphragm
2	AN48.2	Describe & demonstrate the (position, features, important peritoneal and other relations, blood supply, nerve supply, lymphatic drainage and clinical aspects of) important male & female pelvic viscera
3	AN48.3	Describe & demonstrate the origin, course, important relations and branches of internal iliac artery
4	AN48.4	Describe the branches of sacral plexus
5	AN48.5	Explain the anatomical basis of suprapubic cystostomy, Urinary obstruction in benign prostatic hypertrophy, Retroverted uterus, Prolapse uterus, Internal and external haemorrhoids, Anal fistula, Vasectomy, Tubal pregnancy & Tubal ligation
6	AN48.6	Describe the neurological basis of Automatic bladder
7	AN48.7	Mention the lobes involved in benign prostatic hypertrophy & prostatic cancer
8	AN48.8	Mention the structures palpable during vaginal & rectal examination
9	AN49.1	Describe & demonstrate the superficial & deep perineal pouch (boundaries and contents)
10	AN49.2	Describe & identify Perineal body
11	AN49.3	Describe & demonstrate Perineal membrane in male & female
12	AN49.4	Describe & demonstrate boundaries, content & applied anatomy of Ischioanal fossa
13	AN49.5	Explain the anatomical basis of Perineal tear, Episiotomy, Perianal abscess and Anal fissure
14	AN50.1	Describe the curvatures of the vertebral column
15	AN50.2	Describe & demonstrate the type, articular ends, ligaments and movements of Intervertebral joints, Sacroiliac joints & Pubic symphysis
16	AN50.3	Describe lumbar puncture (site, direction of the needle, structures pierced during the lumbar puncture)
17	AN50.4	Explain the anatomical basis of Scoliosis, Lordosis, Prolapsed disc,

		Spondylolisthesis & Spina bifida
18	AN51.1	Describe & identify the cross-section at the level of T8, T10 and L1(transpyloric plane)
19	AN51.2	Describe & identify the midsagittal section of male and female pelvis

General Histology

Sl. No.	Competency number	Competency
1	AN 65.1	Identify epithelium under the microscope & describe the various types that correlate to its function
2	AN 65.2	Describe the ultrastructure of epithelium
3	AN 66.1	Describe & identify various types of connective tissue with functional correlation
4	AN 66.2	Describe the ultrastructure of connective tissue
5	AN 67.1	Describe & identify various types of muscle under the microscope
6	AN 67.2	Classify muscle and describe the structure-function correlation of the same
7	AN 67.3	Describe the ultrastructure of muscular tissue
8	AN 68.1	Describe & Identify multipolar & unipolar neuron, ganglia, peripheral nerve
9	AN 68.2	Describe the structure-function correlation of neuron
10	AN 68.3	Describe the ultrastructure of nervous tissue
11	AN 69.1	Identify elastic & muscular blood vessels, capillaries under the microscope
12	AN 69.2	Describe the various types and structure-function correlation of blood vessel
13	AN 69.3	Describe the ultrastructure of blood vessels
14	AN 70.1	Identify exocrine gland under the microscope & distinguish between serous, mucous and mixed acini
15	AN 70.2	Identify the lymphoid tissue under the microscope & describe microanatomy of lymph node, spleen, thymus, tonsil and correlate the structure with function
16	AN 71.1	Identify bone under the microscope; classify various types and describe the structure-function correlation of the same
17	AN 71.2	Identify cartilage under the microscope & describe various types and structure- function correlation of the same
18	AN 72.1	Identify the skin and its appendages under the microscope and correlate the structure with function
19	AN 52.2	Placenta & Umbilical cord

Systemic Histology

Sl. No.	Competency number	Competency
1	AN 25.1	Identify, draw and label a slide of trachea and lung
2	AN 43.2	Identify, describe and draw the microanatomy of pituitary gland, thyroid, parathyroid gland, tongue, salivary glands, tonsil, epiglottis, cornea, retina
3	AN 43.3	Identify, describe and draw microanatomy of olfactory epithelium, eyelid, lip, sclero-corneal junction, optic nerve
4	AN 52.1	Describe & identify the microanatomical features of Gastro-intestinal system: Oesophagus, Fundus of stomach, Pylorus of stomach, Duodenum, Jejunum, Ileum, Large intestine, Appendix, Liver, Gall bladder, Pancreas & Suprarenal gland
5	AN 52.2	Describe & identify the micro anatomical features of: Urinary system: Kidney, Ureter & Urinary bladder Male Reproductive System: Testis, Epididymis, Vas deferens, Prostate. Female reproductive system: Ovary, Uterus, Uterine tube, Cervix,.
6	AN 52.3	Describe & identify the microanatomical features of Cardiooesophageal junction, Corpus luteum
7	AN 64.1	Describe & identify the microanatomical features of Spinal cord, Cerebellum & Cerebrum

General Embryology

Sl. No.	Competency number	Competency
1	AN76.1	Describe the stages of human life
2	AN76.2	Explain the terms- phylogeny, ontogeny, trimester, viability
3	AN77.1	Describe the uterine changes occurring during the menstrual cycle
4	AN77.2	Describe the synchrony between the ovarian and menstrual cycles

5	AN77.3	Describe spermatogenesis and oogenesis along with diagrams
6	AN77.4	Describe the stages and consequences of fertilisation
7	AN77.5	Enumerate and describe the anatomical principles underlying contraception
8	AN78.1	Describe cleavage and formation of blastocyst
9	AN78.2	Describe the development of trophoblast
10	AN78.3	Describe the process of implantation & common abnormal sites of implantation
11	AN78.4	Describe the formation of extra-embryonic mesoderm and coelom, bilaminar disc and prochordal plate
12	AN78.5	Describe in brief abortion; decidual reaction, pregnancy test
13	AN79.1	Describe the formation & fate of the primitive streak
14	AN79.2	Describe formation & fate of notochord
15	AN79.3	Describe the process of neurulation
16	AN79.4	Describe the development of somites and intra-embryonic coelom
17	AN79.5	Explain embryological basis of congenital malformations, nucleus pulposus, sacrococcygeal teratomas, neural tube defects
18	AN79.6	Describe the diagnosis of pregnancy in first trimester and role of teratogens, alpha-fetoprotein
19	AN77.6	Describe teratogenic influences; fertility and sterility, surrogate motherhood, social significance of "sex-ratio".
20	AN 80.1	Describe formation, functions & fate of chorion: amnion; yolk sac; allantois & decidua
21	AN 80.2	Describe formation & structure of umbilical cord
22	AN 80.3	Describe formation of placenta, its physiological functions, foetomaternal circulation & placental barrier
23	AN 80.4	Describe embryological basis of twinning in monozygotic & dizygotic twins
24	AN 80.5	Describe role of placental hormones in uterine growth & parturition
25	AN 80.6	Explain embryological basis of estimation of fetal age.
26	AN 80.7	Describe various types of umbilical cord attachments

Systemic Embryology

Sl. No.	Competency number	Competency
1	AN 9.3	Describe development of breast
2	AN 13.8	Describe development of upper limb
3	AN 20.10	Describe basic concept of development of lower limb
	AN 25.2	Describe development of pleura, lung & heart
4	AN 25.4	Describe embryological basis of: 1) atrial septal defect, 2) ventricular septal defect, 3) Fallot's tetralogy & 4) tracheo-oesophageal fistula
5	AN 25.5	Describe developmental basis of congenital anomalies, transposition of great vessels, dextrocardia, patent ductus arteriosus and coarctation of aorta
6	AN 25.6	Mention development of aortic arch arteries, SVC, IVC and coronary sinus
7	AN 43.4	Describe the development and developmental basis of congenital anomalies of face, palate, tongue, branchial apparatus, pituitary gland, thyroid gland & eye
8	AN 52.4	Describe the development of anterior abdominal wall

9	AN 52.5	Describe the development and congenital anomalies of Diaphragm
10	AN 52.6	Describe the development and congenital anomalies of: Foregut, Midgut & Hindgut
11	AN 52.7	Describe the development of Urinary system
12	AN 52.8	Describe the development of male & female reproductive system
13	AN 64.2	Describe the development of neural tube, spinal cord, medulla oblongata, pons, midbrain, cerebral hemisphere & cerebellum
14	AN 64.3	Describe various types of open neural tube defects with its embryological basis

Osteology:

Sl. No.	Competency number	Competency
1	AN8.1	Identify the given bone, its side, important features & keep it in anatomical position
2	AN8.2	Identify & describe joints formed by the given bone
3	AN8.3	Enumerate peculiarities of clavicle
4	AN8.4	Demonstrate important muscle attachment on the given bone
5	AN8.5	Identify and name various bones in articulated hand, Specify the parts of metacarpals and phalanges and enumerate the peculiarities of pisiform
6	AN8.6	Describe scaphoid fracture and explain the anatomical basis of avascular necrosis
7	AN14.1	Identify the given bone, its side, important features & keep it in anatomical position
8	AN14.2	Identify & describe joints formed by the given bone
9	AN14.3	Describe the importance of ossification of lower end of femur & upper end of tibia
10	AN14.4	Identify and name various bones in the articulated foot with individual muscle attachment
11	AN21.1	Identify and describe the salient features of sternum, typical rib, 1 st rib and typical thoracic vertebra
12	AN21.2	Identify & describe the features of 2 nd , 11 th and 12 th ribs, 1 st , 11 th and 12 th thoracic vertebrae
13	AN21.3	Describe & demonstrate the boundaries of thoracic inlet, cavity and outlet
14	AN26.1	Demonstrate anatomical position of skull, Identify and locate individual skull bones in skull
15	AN26.2	Describe the features of norma frontalis, verticalis, occipitalis, lateralis and basalis
16	AN26.3	Describe cranial cavity, its subdivisions, foramina and structures passing through them
17	AN26.4	Describe morphological features of mandible
18	AN26.5	Describe features of typical and atypical cervical vertebrae (atlas and axis)
19	AN26.6	Explain the concept of bones that ossify in membrane
20	AN26.7	Describe the features of the 7 th cervical vertebra
21	AN53.2	Demonstrate the anatomical position of bony pelvis & show boundaries of pelvic inlet, pelvic cavity, pelvic outlet
22	AN53.3	Define true pelvis and false pelvis and demonstrate sex determination in male & female bony pelvis
23	AN53.4	Explain and demonstrate clinical importance of bones of abdominopelvic region

		(sacralization of lumbar vertebra, Lumbarization of 1st sacral vertebra, types of bony pelvis & Coccyx)

Genetics

Sl. No.	Competency number	Competency
1	AN73.1	Describe the structure of chromosomes with classification
2	AN73.2	Describe technique of karyotyping with its applications
3	AN73.3	Describe the Lyon's hypothesis
4	AN74.1	Describe the various modes of inheritance with examples
5	AN74.2	Draw pedigree charts for the various types of inheritance & give examples of diseases of each mode of inheritance
6	AN74.3	Describe multifactorial inheritance with examples
7	AN74.4	Describe the genetic basis & clinical features of Achondroplasia, Cystic Fibrosis, Vitamin D resistant rickets, Haemophilia, Duchene's muscular dystrophy & Sickle cell anaemia
8	AN75.1	Describe the structural and numerical chromosomal aberrations
9	AN75.2	Explain the terms mosaics and chimeras with example
10	AN75.3	Describe the genetic basis & clinical features of Prader Willi syndrome, Edward syndrome & Patau syndrome
11	AN75.4	Describe genetic basis of variation: polymorphism and mutation
12	AN75.5	Describe the principles of genetic counselling
13	AN81.1	Describe various methods of prenatal diagnosis
14	AN81.2	Describe indications, process and disadvantages of amniocentesis
15	AN81.3	Describe indications, process and disadvantages of chorion villus biopsy

Surface Anatomy

Sl. No.	Competency number	Competency
1	AN 13.6	Identify & demonstrate important bony landmarks of upper limb: Jugular notch,

		sternal angle, acromial angle, spine of the scapula, vertebral level of the medial end, Inferior angle of the scapula
2	AN 13.7	Identify & demonstrate surface projection of: Cephalic and basilic vein, Palpation of Brachial artery, Radial artery, Testing of muscles: Trapezius, pectoralis major, serratus anterior, latissimus dorsi, deltoid, biceps brachii, Brachioradialis
3	AN 20.7	Identify & demonstrate important bony landmarks of lower limb: -Vertebral levels of highest point of iliac crest, posterior superior iliac spines, iliac tubercle, pubic tubercle, ischial tuberosity, adductor tubercle, Tibial tuberosity, head of fibula, Medial and lateral malleoli, Condyles of femur and tibia, sustentaculum tali, tuberosity of fifth metatarsal, tuberosity of the navicular
4	AN 20.8	Identify & demonstrate palpation of femoral, popliteal, post tibial, anti tibial & dorsalis pedis blood vessels in a simulated environment
5	AN 20.9	Identify & demonstrate Palpation of vessels (femoral, popliteal, dorsalis pedis, post tibial), Mid inguinal point, Surface projection of: femoral nerve, Saphenous opening, Sciatic, tibial, common peroneal & deep peroneal nerve, Great and small saphenous veins
6	AN 25.9	Demonstrate surface marking of lines of pleural reflection, lung borders and fissures, trachea, heart borders, apex beat & surface projection of valves of heart
7	AN 43.5	Demonstrate- Palpation of carotid arteries, facial artery, superficial temporal artery, 3) Location of internal and external jugular veins, 4) Location of hyoid bone, thyroid cartilage and cricoid cartilage with their vertebral levels
8	AN 43.6	Demonstrate surface projection of- Thyroid gland, Parotid gland and duct, Pterion, Common carotid artery, Internal jugular vein, Subclavian vein, External jugular vein, Facial artery in the face & accessory nerve
9	AN 44.1	Describe & demonstrate the Planes (transpyloric, transtubercular, subcostal, lateral vertical, linea alba, linea semilunaris), regions & Quadrants of abdomen
10	AN 55.1	Demonstrate the surface marking of; Regions and planes of abdomen, Superficial inguinal ring, Deep inguinal ring, McBurney's point, Renal Angle & Murphy's point
11	AN 55.2	Demonstrate the surface projections of: Stomach, Liver, Fundus of gall bladder, Spleen, Duodenum, Pancreas, Ileocaecal junction, Kidneys & Root of mesentery

Radiology

Sl. No.	Competency number	Competency
1	AN 13.5	Identify the bones and joints of upper limb seen in anteroposterior and lateral view radiographs of shoulder region, arm, elbow, forearm and hand
2	AN 20.6	Identify the bones and joints of lower limb seen in anteroposterior and lateral view radiographs of various regions of lower limb
3	AN 25.7	Identify structures seen on a plain x-ray chest (PA view)

4	AN 25.8	Identify and describe in brief a barium swallow
5	AN 43.7	Identify the anatomical structures in 1) Plain x-ray skull, 2) AP view and lateral view 3) Plain x-ray cervical spine-AP and lateral view 4) Plain x-ray of paranasal sinuses
6	AN 43.8	Describe the anatomical route used for carotid angiogram and vertebral angiogram
7	AN 43.9	Identify anatomical structures in carotid angiogram and vertebral angiogram
8	AN 54.1	Describe & identify features of plain X ray abdomen
9	AN 54.2	Identify features of plain X ray abdomen
10	AN 54.2	Describe & identify the special radiographs of abdominopelvic region (contrast X ray Barium swallow, Barium meal, Barium enema, Cholecystography, Intravenous pyelography & Hysterosalpingography)
11	AN 54.3	Identify the special radiographs of abdominopelvic region (contrast X ray Barium swallow, Barium meal, Barium enema, Cholecystography, Intravenous pyelography & Hysterosalpingography)
12	AN 54.3	Describe role of ERCP, CT abdomen, MRI, Arteriography in radiodiagnosis of abdomen

AETCOM – 12 Hours

Sl. No.	Competency number	Competency
1	AN 82.1	Demonstrate respect and follow the correct procedure when handling cadavers and other biologic tissue
2	----	Enumerate and describe professional qualities and roles of a physician
3	----	Describe and discuss the commitment to lifelong learning as an important part of physician growth.
4	----	Describe and discuss the role of a physician in health care system
5	-----	Identify and discuss physician's role and responsibility to society and the community that she/ he serves

INTEGRATION TOPICS

PHYSIOLOGY

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	PY3.1	Describe the structure and functions of a neuron and neuroglia; Discuss Nerve Growth Factor & other growth factors/cytokines		Human Anatomy
2	PY3.7	Describe the different types of muscle fibres and their structure		Human Anatomy
3	PY3.13	Describe muscular dystrophy: myopathies	Gen. Medicine	Human Anatomy
4	PY4.1	Describe the structure and functions of digestive system		Human Anatomy
5	PY5.1	Describe the functional Anatomy of heart including chambers, sounds; and Pacemaker tissue and conducting system.		Human Anatomy
6	PY5.6	Describe abnormal ECG, arrhythmias, heart block and myocardial Infarction	Gen. Medicine	Human Anatomy

7	PY9.1	Describe and discuss sex determination; sex differentiation and their abnormalities and outline psychiatry and practical implication of sex determination.		Human Anatomy
8	PY10.1	Describe and discuss the organization of nervous system		Human Anatomy
9	PY10.2	Describe and discuss the functions and properties of synapse, reflex, receptors		Human Anatomy
10	PY10.3	Describe and discuss somatic sensations & sensory tracts		Human Anatomy
11	PY10.4	Describe and discuss motor tracts, mechanism of maintenance of tone, control of body movements, posture and equilibrium & vestibular apparatus		Human Anatomy
12	PY10.5	Describe and discuss structure and functions of reticular activating system, autonomic nervous system (ANS)		Human Anatomy
13	PY10.6	Describe and discuss Spinal cord, its functions, lesion & sensory disturbances		Human Anatomy
14	PY10.7	Describe and discuss functions of cerebral cortex, basal ganglia, thalamus, hypothalamus, cerebellum and limbic system and their abnormalities	Psychiatry	Human Anatomy
15	PY10.11	Demonstrate the correct clinical examination of the nervous system: Higher functions, Sensory system, motor Human Anatomy system, reflexes, Cranial Nerves in a normal volunteer or simulated environment		Human Anatomy

BIOCHEMISTRY

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	BI6.13	Describe the functions of the kidney, liver, thyroid and adrenal glands	Pathology, General Medicine	Physiology, Human Anatomy
2	BI6.14	Describe the tests that are commonly done in clinical practice to assess the functions of these organs (kidney, liver, thyroid and	Pathology, General Medicine	Physiology, Human Anatomy

		adrenal glands).		
3	BI6.15	Describe the abnormalities of kidney, liver, thyroid and adrenal glands	Pathology, General Medicine	Physiology, Human Anatomy

PATHOLOGY

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	PA28.10	Describe the etiology, pathogenesis, pathology, laboratory findings, distinguishing features progression and complications of acute and chronic pyelonephritis and reflux nephropathy	Human Anatomy, General Surgery	
2	PA31.1	Classify and describe the types, etiology, pathogenesis, pathology and hormonal dependency of benign breast disease	Human Anatomy, General Surgery	
3	PA32.1	Enumerate, classify and describe the etiology, pathogenesis, pathology and iodine dependency of thyroid swellings	Human Anatomy Physiology, General Medicine, General Surgery	
4	PA32.9	Describe the etiology, pathogenesis, manifestations, laboratory and morphologic features of adrenal neoplasms	Human Anatomy, Physiology, General Medicine, General Surgery	
5	PA33.1	Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications of osteomyelitis	Human Anatomy, Orthopedics	Microbiology

FORENSIC MEDICINE & TOXICOLOGY

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration

1	FM2.28	Describe and discuss signs of intrauterine death, signs of live birth, viability of foetus, age determination of foetus, DOAP session of ossification centres, Hydrostatic test, Sudden infants death syndrome and Munchausen's syndrome by proxy.	Pediatrics, Human Anatomy	
2	FM3.1	Identification, Define and describe Corpus Delicti, establishment of identity of living persons including race, Sex, religion, complexion, stature, age determination using morphology, teeth-eruption, decay, bite marks, bones, ossification centres, medico-legal aspects of age.	Human Anatomy	

ANESTHESIOLOGY

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	AS4.2	Describe the Anatomy of the airway and its implications for general anaesthesia	Human Anatomy	
2	AS5.2	Describe the correlative Anatomy of the brachial plexus, subarachnoid and epidural spaces	Human Anatomy	
3	AS5.3	Observe and describe the principles and steps/ techniques involved in peripheral nerve blocks	Human Anatomy	
4	AS8.1	Describe the anatomical correlates and physiologic principles of pain	Human Anatomy, Physiology	

ENT

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	EN1.1	Describe the Human Anatomy & physiology of ear, nose, throat, head & neck.	Human Anatomy	

OPHTHALMOLOGY

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	OP2.1	Enumerate the causes, describe and discuss the aetiology, clinical presentations and diagnostic features of common conditions of the lid and adnexa including Hordeolum externum/ internum, blepharitis, preseptal cellulitis, dacryocystitis, hemangioma, dermoid, ptosis, entropion, lid lag, lagophthalmos		Human Anatomy
2	OP4.1	Enumerate describe and discuss the types and causes of corneal ulceration		Human Anatomy
3	OP7.1	Describe the surgical anatomy and the metabolism of the lens	Biochemistry, Human Anatomy	
4	OP8.1	Discuss the aetiology, pathology, clinical features and management of vascular occlusions of the retina	Human Anatomy, Pathology	

DENTISTRY

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	DE1.1	Enumerate the parts of the tooth	Human Anatomy	
2	DE5.1	Enumerate the parts of the tooth and supporting structures	Human Anatomy	

GENERAL MEDICINE

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	IM3.1	Define discuss describe and distinguish community acquired pneumonia, nosocomial pneumonia and aspiration pneumonia	Human Anatomy, Pathology, Microbiology	
2	IM13.9	Demonstrate in a mannequin the correct technique for performing breast exam, rectal examination and cervical examination and pap smear	Human Anatomy	General Surgery
3	IM17.1	Define and classify headache and describe the presenting features, precipitating factors, aggravating and relieving factors of various kinds of headache	Human Anatomy	
4	IM18.1	Describe the functional and the vascular anatomy of the brain	Human Anatomy	
5	IM19.1	Describe the functional anatomy of the locomotor system of the brain	Human Anatomy, Physiology	

OBG

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	OG2.1	Describe and discuss the development and anatomy of the female reproductive tract, relationship to other pelvic organs, applied anatomy as related to Obstetrics and Gynaecology.	Human Anatomy	
2	OG4.1	Describe and discuss the basic embryology of fetus , factors influencing fetal growth and development, anatomy and physiology of placenta, and teratogenesis	Human Anatomy	
3	OG14.1	Enumerate and discuss the diameters of maternal pelvis and types	Human Anatomy	

GENERAL SURGERY

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	SU19.1	Describe the etiology and classification of cleft lip and palate	Human Anatomy	
2	SU19.2	Describe the Principles of reconstruction of cleft lip and palate	Human Anatomy	
3	SU22.1	Describe the Applied anatomy, and physiology of thyroid	Human Anatomy	
4	SU22.5	Describe the applied anatomy of parathyroid.	Human Anatomy	
5	SU23.1	Describe the applied anatomy of adrenal glands	Human Anatomy	
6	SU24.1	Describe the clinical features, principles of investigation, prognosis and management of pancreatitis.	Human Anatomy	
7	SU25.1	Describe applied anatomy appropriate investigations for breast disease	Human Anatomy	
8	SU28.2	Describe the clinical features, investigations and principles of management of congenital anomalies of Genitourinary system.	Human Anatomy	
9	SU28.5	Describe the applied anatomy and physiology of esophagus	Human Anatomy Physiology	
10	SU28.7	Describe the applied anatomy and physiology of stomach.	Human Anatomy	
11	SU28.10	Describe the applied anatomy of liver. Describe the Clinical features, Investigations and principles of management of Liver abscess, hydatid disease, Injuries and Tumors of the liver	Human Anatomy	
12	SU28.11	Describe the applied anatomy of Spleen. Describe the clinical features, Investigations and principles of management of splenic injuries. Describe the Post-splenectomy sepsis- prophylaxis.	Human Anatomy	
13	SU28.12	Describe the applied anatomy of biliary system. Describe the clinical features, investigations and	Human Anatomy	

		principles of management of diseases of biliary system.		
14	SU28.13	Describe the applied anatomy of small and large intestines	Human Anatomy	
15	SU28.16	Describe applied anatomy including congenital anomalies of the rectum and anal canal	Human Anatomy	
16	SU30.2	Describe the applied anatomy, clinical features, investigations and principles of management of Undescended testis.	Human Anatomy	
17	SU30.3	Describe the applied anatomy, clinical features, investigations and principles of management of Epididymo-orchitis	Human Anatomy	
18	SU30.4	Describe the applied anatomy, clinical features, investigations and principles of management of Varicocele	Human Anatomy	
19	SU30.5	Describe the applied anatomy, clinical features, investigations and principles of management of Hydrocele	Human Anatomy	

ORTHOPEDICS

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	OR2.1	Describe and discuss the mechanism of Injury, clinical features, investigations and plan management of fracture of clavicle	Human Anatomy	
2	OR2.2	Describe and discuss the mechanism of Injury, clinical features, investigations and plan management of fractures of proximal humerus	Human Anatomy	
3	OR2.3	Describe and discuss the mechanism of Injury, clinical features, investigations and plan management of supra condylar fracture of humerus	Human Anatomy	
4	OR2.4	Describe and discuss the mechanism of injury, clinical features, investigations and principles of management of fracture of shaft of humerus and intercondylar fracture humerus with emphasis on neurovascular deficit	Human Anatomy	
5	OR2.5	Describe and discuss the aetiopathogenesis, clinical features, mechanism of injury, investigation & principles of management of fractures of both bones forearm and Galeazzi and Monteggia injury	Human Anatomy	
6	OR2.6	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of fractures of distal radius	Human Anatomy	
7	OR2.7	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of pelvic injuries with emphasis on hemodynamic instability	Human Anatomy	
8	OR2.8	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of spine injuries with emphasis on mobilisation of the patient	Human Anatomy	
9	OR2.9	Describe and discuss the mechanism of injury, Clinical features, investigations and principle of management of acetabular fracture	Human Anatomy	
10	OR2.10	Describe and discuss the aetiopathogenesis,	Human	

		mechanism of injury, clinical features, investigations and principles of management of fractures of proximal femur	Anatomy	
11	OR2.11	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of (a) Fracture patella (b) Fracture distal femur © Fracture proximal tibia with special focus on neurovascular injury and compartment syndrome	Human Anatomy	
12	OR2.12	Describe and discuss the aetiopathogenesis, clinical features, Investigation and principles of management of Fracture shaft of femur in all age groups and the recognition and management of fat embolism as a complication	Human Anatomy	
13	OR2.13	Describe and discuss the aetiopathogenesis, clinical features, Investigation and principles of management of: (a) Fracture both bones leg (b) Calcaneus (c) Small bones of foot	Human Anatomy	
14	OR2.14	Describe and discuss the aetiopathogenesis, clinical features, Investigation and principles of management of ankle fractures	Human Anatomy	
15	OR2.15	Plan and interpret the investigations to diagnose complications of fractures like malunion, non-union, infection, compartmental syndrome	Human Anatomy	
16	OR2.16	Describe and discuss the mechanism of injury, clinical features, investigations and principles of management of open fractures with focus on secondary infection, prevention and management	Human Anatomy	
17	OR11.1	Describe and discuss the aetiopathogenesis, Clinical features, Investigations and principles of management of peripheral nerve injuries in diseases like foot drop, wrist drop, claw hand, palsies of Radial, Ulnar, Median, Lateral Popliteal and Sciatic Nerves	Human Anatomy	
18	OR12.1	Describe and discuss the Clinical features, Investigations and principles of management of Congenital and acquired malformations and	Human Anatomy	

		deformities of: a. limbs and spine - Scoliosis and spinal bifida b. Congenital dislocation of Hip,Torticollis, c. congenital talipes equino varus		

PHYSICAL MEDICINE & REHABILITATION

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	PM2.1	Describe the causes of disability in the patient with a cerebrovascular accident	Human Anatomy	General Medicine
2	PM3.1	Describe and discuss the clinical features, types, evaluation, diagnosis and management of cerebral palsy	Human Anatomy	Pediatrics

PEDIATRICS

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	PE32.1	Discuss the genetic basis, risk factors, complications, prenatal diagnosis, management and genetic counselling in Down's Syndrome	Human Anatomy	

Curriculum for Biochemistry 2022



**Ramaiah Medical College
Ramaiah University of Applied Sciences
Bengaluru-560054**

BIOCHEMISTRY

INTRODUCTION TO THE DEPARTMENT

The teaching of Biochemistry focuses on the structure and function of cellular components and bio-molecules as well as integrates the application of this knowledge in a clinical scenario. This is essential to understand the complex biochemical interactions within the human body both in health and disease.

The team of teaching faculty is well balanced in terms of qualification, age and experience. Apart from the academic commitments in the medical college, the department renders round the clock services in the Biochemistry section of the Diagnostic laboratory which is NABL accredited, endowed with state of the art facilities, latest equipment, skilled laboratory personnel in an effort to provide quality health care service to patients.

Value additions to the teaching/learning of Biochemistry includes-a vast database of case scenarios, a well stocked question bank, regular day to day assessments & Viva-voce sessions, interactive group discussions during practicals as well as lectures, meticulously planned integrated teaching /Linker sessions along with diagnostic laboratory visits, clinician conducted systems overview, opportunities to develop adult learning practices during Self directed learning sessions and learning by observation and co-relation during ECE sessions. All these, enable students to understand concepts, remove misconceptions regarding the chemistry aspect of the subject, highlight the role of biochemical mechanisms in health and causation of certain diseases and orients students towards planning and pursuing research projects. An attempt is made to draw the attention of students towards the role of Biochemistry in screening, diagnosis, treatment and management in Non-communicable diseases, Communicable diseases and in healthy subjects- Highlighting the importance of clinical biochemistry and diagnostic laboratory in hospital setup.

Course Outcomes- Biochemistry

1. Describe structure, function, and metabolic interrelationship/integration of biomolecules - Carbohydrates, Proteins, Lipids, Vitamins, Minerals, Nucleic acids, Enzymes & Water in health and disease along with organ function tests.
2. Describe the molecular mechanism of gene expression and regulation, principles of genetic engineering and their application in medicine.
3. Explain the biochemical basis, associated consequences, rationale of clinical laboratory tests for diseases, inborn errors of metabolism, and interpret the results in the clinical context.

4. Follow good laboratory practices; handle biological tissue, and body fluid along with judicious choice of investigations for screening and diagnosis in health & disease.
5. Perform routine and some special investigations making use of conventional instruments/techniques, analyze and interpret the biochemical investigation data.
6. Integrate the biochemistry knowledge with other medical subjects for better understanding of health and Diseases and demonstrate the skills of solving clinical problems and decision making.

AIM:

Impart quality education through innovative teaching and research.

GOAL:

The broad goal is to teach Biochemistry to undergraduate students to make them understand the scientific basis of the life processes at the molecular level and to orient them towards the application of the knowledge acquired in solving clinical problems.

SUBJECT SPECIFIC COMPETENCIES UNDER VARIOUS DOMAINS BY STUDENTS:

A. Cognitive domain

1. Describe and apply biochemical principles to explain the normal state, abnormal disease conditions and mechanism of action used in the perception, diagnosis and treatment of diseases.
2. Explain energy transactions in a living system, and describe importance of biomolecules in sustaining the life process.
3. Describe pathways of the intermediary metabolism along with their individual and integrated regulation and apply that in understanding the functioning of the body.
4. Describe and apply the concept of nutrition in health and disease, micro- and macronutrition and essential nutrients, and interlinks of nutrients with metabolism and functions of a living system.
5. Apply and integrate knowledge of molecular and metabolic conditions in normal and disease states for clinical problem solving and research
6. Acquire basic knowledge towards the evaluation and interpretation of molecular and metabolic disease states.
7. Evaluate, analyze and monitor disease states by applying relevant biochemical investigations and interpreting the clinical and laboratory data.
8. Able to integrate principles of immunology in biochemistry.

9. Demonstrate knowledge of basics of research methodology, develop a research protocol, analyse data using currently available statistical software, interpret results and disseminate these results and to have the potential ability to pursue further specializations and eventually be competent to guide students.
10. Describe the principles of teaching - learning technology towards application and take interactive classroom lectures, prepare modules for PBL, organize and conduct PBLs, case discussions, small group discussions, Seminars, Journal club and research presentations
11. Demonstrate knowledge of principles of Instrumentation.
12. Demonstrate knowledge about recent advances and trends in research in the field of clinical biochemistry.

B. Affective domain

1. Effectively explain to patients from a variety of backgrounds, the molecular and metabolic basis of disease states and lifestyle modifications.
2. Communicate biochemical reasoning effectively with peers, staff and faculty, and other members of the health care team.
3. Demonstrate empathy and respect towards patients regardless of the biochemical nature of their disease.
4. Demonstrate respect in interactions with patients, families, peers, and other healthcare professionals.
5. Demonstrate ethical behavior and integrity in one's work.
6. Demonstrate effective use of nutrition, lifestyle and genetic counseling.
7. Be aware of the cost of diagnostic tests and economic status of patients.
8. Acquire skills for self-directed learning to keep up with developments in the field and to continuously build to improve on skills and expertise

C. Psychomotor domain

1. Able to select, justify, and interpret the results of clinical tests in biochemistry.
2. Predict effectiveness and adverse effects associated with disease intervention.
3. Demonstrate skills for clinical diagnosis, testing, understanding of biochemical conditions and diagnostic service.
4. Perform important biochemical, immunological and molecular biology techniques.
5. Observe working of important advanced techniques.
6. Demonstrate standard operating procedures of various methods and techniques used in clinical biochemistry.

7. Determination of enzyme activity and study of enzyme kinetics. Ideally it should be accompanied by purification (partial) of the enzyme from a crude homogenate to emphasise the concepts of specific activity.
8. Demonstrate presentation skills at academic meetings and publications.

OBJECTIVES & COMPETENCIES

A. Period of Training- Phase I MBBS

Knowledge - At the end of the course, the student should be able to:

1. Describe the molecular and functional organization of a cell and its subcellular components; Delineate structure, function and inter- relationships of biomolecules and consequences of deviation from normal;
2. Summarize the fundamental aspects of enzymology and clinical application wherein regulation of enzymatic activity is altered;
3. Describe digestion and assimilation of nutrients and consequences of malnutrition; Integrate the various aspects of metabolism and their regulatory pathways;
4. Explain the biochemical basis of inherited disorders with their associated sequelae;
5. Describe mechanisms involved in maintenance of body fluid and pH homeostasis;
6. Outline the molecular mechanisms of gene expression and regulation, the principles of genetic engineering and their application in medicine;
7. Summarize the molecular concepts of body defence and their application in medicine;
8. Outline the biochemical basis of environmental health hazards, biochemical basis of cancer and carcinogenesis;
9. Familiarize with the principles of various conventional and specialized laboratory investigations and instrumentation analysis and interpretation of a given data; Suggest laboratory investigations to support theoretical concepts and clinical diagnosis.

Skills- At the end of the course, the student should be able to:

1. Make use of conventional techniques/instruments to perform biochemical analysis relevant to clinical screening and diagnosis; Analyze and interpret investigative data;
2. Demonstrate the skills of solving scientific and clinical problems and decision making;

Integration- The knowledge acquired in Biochemistry should help the students to integrate molecular events with structure and function of the human body in health and disease.

B. Period of Training – Internship - Laboratory Medicine elective during Internship – Posting to the Clinical Biochemistry Lab for 07 days -

At the end of the posting, the intern should be able to

1. Describe the steps of Specimen collection; list the Pre- analytical& post analytical errors in a diagnostic lab.
2. List the investigations, reference ranges of tests, interpretation of results of tests that are done as part of screening, diagnosis, management of Diabetes Mellitus and its complications, Cardiovascular diseases, Renal disorders, Liver disorders, Nutritional Disorders, other Endocrine disorders, Malignancies, Inflammation/Sepsis, Pregnancy related disorders and Paediatric disorders.
3. List the utility of Blood Gas analysis using ABG analyser, errors involved and its interpretation

Competencies in Phase 1 MBBS		
No.	Topic	Competencies
1	Cell and organelles, cell membrane, Transport across cell membrane	01
2	Enzymes	07
3	Chemistry and metabolism of carbohydrates	10
4	Chemistry and metabolism of Lipids	07
5	Chemistry and metabolism of Proteins	05
6	Metabolism and Homeostasis	15
7	Molecular Biology	07
8	Nutrition	05
9	Extracellular matrix	03
10	Oncogenesis and Immunity	05
	Total in Theory	65
11	Biochemistry Laboratory Tests- Practicals	24
	TOTAL	89

MINIMUM TEACHING HOURS

Curricular component	Time allotted in hours
Lectures	80
Small group teaching/tutorials/integrated learning/practicals	150
Self-Directed Learning	20

Early Clinical Exposure ECE (basic science correlation and clinical skills)	30 (18 +12)
Total	280
AETCOM module 1.4	7
<i>Theory hours at least 4 hours per week</i> <i>Practicals approximately 05 hours per week</i> <i>ECE once a month 03 hours session.</i> <i>Shared integrated teaching hours & Linker sessions once a week</i> <i>Lectures, SDL, SGT, Tutorials, and Case-Based Learning to be held either during hours allotted for Theory or Practical so as to maximize student learning, participation and performance.</i>	

MINIMUM TEACHING HOURS IN INTERNSHIP AS AN ELECTIVE

Subject	Period of posting
Clinical chemistry (Laboratory medicine)	7 days

COURSE CONTENT

List of Competencies and SLOs to be covered in Phase I MBBS

RELEVANCE OF BIOCHEMISTRY IN MEDICINE (ORIENTATION LECTURE)

- State the importance of Biochemistry in health and disease with examples

CELL AND ORGANELLES, CELL MEMBRANE, TRANSPORT ACROSS CELL MEMBRANES

BI1.1 Describe the Molecular and Functional Organisation of a cell and its Subcellular components

- Explain the differences between prokaryotic and eukaryotic cell
- Describe structure and enumerate functions of sub-cellular organelles and cytoskeleton components (microtubules, microfilaments etc) with suitable diagrams
- List the Marker enzymes of cell membrane and sub-cellular organelles
- List the steps of the process used to separate cell organelles

- Describe structure and enumerate functions of cell membrane with suitable diagram (Fluidmosaic model)

- Explain components of cell membrane contributing to membrane asymmetry and membrane fluidity and their importance
- List different types of transport mechanism across cell membranes for small and large molecules along with examples.
- Describe different types of mechanism across cell membranes for small and large molecules including active (primary and secondary), passive (simple and facilitated diffusion), endocytosis and exocytosis with suitable examples
- Enumerate the disorders related to cell membrane and subcellular organelles
- List the types and functions of Aquaporins
- Enumerate the types and functions of ABC family of transporters.

ENZYMES

BI2.1 Explain fundamental concepts of enzyme, isoenzyme, alloenzyme, Coenzyme & co-factors.

- Define Enzymes, Coenzymes and Cofactors, Isoenzyme, Alloenzyme
- Proenzymes, Ribozymes with suitable examples
- Classify enzymes(IUBMB) with suitable examples
- Explain the role of Coenzymes and Cofactors in enzyme catalysed reaction with examples

BI2.2 Observe the estimation of SGOT & SGPT

- Observe the estimation of SGOT, SGPT and ALP and interpret the results in given sample accurately.

BI2.3 Describe and explain the basic principles of enzyme activity

- Describe the features of active site of enzyme and its relevance in enzyme action.
- Explain the mechanism of Enzyme action related to substrate binding(lock and key model and Koshland's induced fit theory) including concepts of activation energy, transition state and binding energy
- List different mechanisms of enzyme catalysis
- Explain different factors affecting enzyme activity
- Explain the effect of substrate concentration on enzyme activity
- Define K_m and V_{max} and explain their significance
- List different types of Enzyme specificity with suitable examples
- Explain various mechanisms of short term regulation of enzyme activity with e.g. including Covalent modification, Zymogen activation, Allosteric regulation, Feedback regulation
- Explain various mechanisms of long term regulation of enzyme activity with examples including induction and repression

BI2.4 Describe and discuss enzyme inhibitors as poisons and drugs and as therapeutic enzymes

- Explain Competitive and Non-competitive inhibition with examples of clinical importance
- Explain Suicide inhibition with example
- Describe the role of enzymes as Therapeutic agents

- Explain the role of enzymes as toxins with example

BI2.5 Describe and discuss the clinical utility of various serum enzymes as markers of pathological conditions.

- Discuss the diagnostic importance of enzymes in cardiac, liver, pancreatic, bone and prostate disorders.
- Discuss the diagnostic importance of enzymes and isoenzymes in myocardial infarction
- Discuss the therapeutic importance of isoenzymes with examples.
- Enumerate the difference between functional and non functional plasma enzymes with suitable examples
- Explain the possible mechanisms of alteration in enzyme and isoenzyme levels in circulation in different pathological conditions of heart, liver, pancreas, bone and prostate
- List the enzymes that are used as tumor markers

BI2.6 Discuss use of enzymes in laboratory investigations (Enzyme-based assays)

- Describe the use of enzymes in diagnostic assays.
- Describe the use of enzymes in techniques like recombinant DNA technology, PCR etc
- Describe the use of enzymes as labels in techniques like ELISA, RIA

BI2.7 Interpret laboratory results of enzyme activities & describe the clinical utility of various enzymes as markers of pathological conditions.

- Interpret the lab test reports of enzymes and isoenzymes in cardiac disorders
- Interpret the lab test reports of enzymes and isoenzymes in liver disorders
- Interpret the lab test reports of enzymes and isoenzymes in pancreatic disorders
- Interpret the lab test reports of enzymes and isoenzymes in bone disorders
- Interpret the lab test reports of enzymes and isoenzymes in prostate disorders

CHEMISTRY AND METABOLISM OF CARBOHYDRATES

BI3.1 Discuss and differentiate monosaccharides, disaccharides and polysaccharides giving examples of main carbohydrates as energy fuel, structural element and storage in the human body

- Define carbohydrates
- Explain the biomedical importance of carbohydrates as energy source, storage and structural element along with biological importance of glycolipids, glycoproteins, sialic acid and blood group substances.
- Classify carbohydrates with examples and biological importance.
- List the Monosaccharide derivatives
- Mention the clinical significance of Uronic acids, amino sugars, Glycosides, Sorbitol, Mannitol
- Describe the biologically important disaccharides and oligosaccharides

- Define Polysaccharides, Homopolysaccharides, Heteropolysaccharides
- Explain the composition and importance of starch, glycogen, Dextran, Cellulose and Inulin.
- Explain the composition and importance of mucopolysaccharides.
- Differentiate between glycation and glycosylation

BI3.2 Describe the processes involved in digestion and assimilation of Carbohydrates and storage.

- Describe the different types of Glucose transporters and importance.
- Explain Insulin dependent and Insulin independent uptake of glucose by tissues

BI3.3 Describe and discuss the digestion and assimilation of carbohydrates from food.

- List the digestible and non digestible dietary carbohydrates with their biological importance
- Explain the process of digestion of dietary carbohydrates
- Explain the mechanism of absorption of digested end products of dietary carbohydrates
- Explain the causes, biochemical basis of clinical features and management of lactose intolerance
- Define and differentiate the pathways of carbohydrate metabolism, (Glycolysis, gluconeogenesis, glycogen metabolism, HMP shunt).
- Describe the process of Glycolysis (aerobic and anaerobic) highlighting the significance, site, reactions, key steps, energetics, regulation and inhibitors
- Explain the substrate level phosphorylation reactions in glycolysis.
- Differentiate between aerobic and anaerobic glycolysis
- Explain Rapaport Leubering cycle and its significance
- List the cofactors required for Pyruvate dehydrogenase (PDH) reaction
- Explain the significance, Site, reactions, key steps, energetics, regulation of Gluconeogenesis
- Explain the mechanism of transport of Lactate and Alanine from skeletal muscle to liver for gluconeogenesis
- Explain the role of adipose tissue in gluconeogenesis in prolonged fasting
- Explain the significance, Site, reactions, key steps, energetics, regulation of Glycogenesis
- Explain the significance, Site, reactions, key steps, energetics, regulation of Glycogenolysis
- Describe Glycogen storage disorders with enzyme defects and features
- Explain the significance of HMP shunt pathway
- Explain the significance of Uronic acid pathway

BI3.5 Describe and discuss the regulation, functions and integration of carbohydrate along with associated diseases/disorders.

- Discuss the regulation of glycolysis, gluconeogenesis in well fed and fasting conditions

- Discuss the regulation of glycogen metabolism in well fed and fasting conditions
- Describe the features of Glucose – 6 – Phosphate dehydrogenase deficiency
- Name the enzyme defect in Galactosemia and describe the clinical features
- Name the enzyme defect and features of Essential Fructosuria, Hereditary fructose intolerance, Essential pentosuria

BI3.6 Describe and discuss the concept of TCA cycle as amphibolic pathway and its regulation.

- Describe the sequential steps of Citric acid cycle with significance, site, key steps, energetics, regulation and inhibitors
- Explain the Amphibolic role of Citric acid cycle
- Explain the Anaplerotic reactions of Citric acid cycle

BI3.7 Describe the common poisons that inhibit crucial enzymes of carbohydrate metabolism (eg. fluoride, arsenate)

- Explain the action of inhibitors on glycolytic enzymes and their importance
- Explain the action of inhibitors on enzymes of citric acid cycle and their importance

BI3.8 Discuss and interpret laboratory results of analytes associated with metabolism of carbohydrates.

- List the lab investigations done in Glycogen storage disorders, Galactosemia, Glucose-6-Phosphate dehydrogenase deficiency,
- Essential Fructosuria, Hereditary fructose intolerance
- Interpret the lab investigations done in Glycogen storage disorders, Galactosemia, Glucose-6-Phosphate dehydrogenase deficiency,
- Essential Fructosuria, Hereditary fructose intolerance

BI3.9 Discuss the mechanism and significance of blood glucose regulation in health and disease.

- State the normal plasma glucose levels in fasting, post prandial and random samples and interpret the given reports
- Explain the mechanism of regulation of blood glucose levels in well fed condition and fasting/starvation.
- Explain the importance of blood glucose regulation in normal healthy individual in well fed, overnight fasting and during exercise states
- Explain the derangements in blood glucose regulations in abnormal conditions of diabetes mellitus and starvation
- Explain various metabolic changes taking place in diabetes mellitus
- Describe the biochemical basis of acute complications of diabetes mellitus
- Describe the biochemical basis of chronic complications of diabetes mellitus
- Differentiate the hormonal regulation of blood glucose among obese and non obese individuals

BI3.10 Interpret the results of blood glucose levels and other laboratory investigations related to disorders of carbohydrate metabolism.

- State the normal plasma levels of glucose in fasting, postprandial and random conditions
- Interpret the plasma glucose levels as hyperglycemia or hypoglycaemia against normal biological reference intervals
- Explain diagnostic criteria of diabetes mellitus including WHO and ADA guidelines
- List the complications of diabetes mellitus including acute metabolic, microvascular and macrovascular complications
- List the lab investigations done in diabetes mellitus and its relevance
- Define oral glucose tolerance test and list the indications, contraindications and different types of GTT including classical, oral, intravenous, mini, clinical/physiological GTT
- Explain the precautions advised to patients before GTT
- Interpret the oral GTT report against the recent recommendations of normal, impaired glucose tolerance (IGT), impaired fasting glucose (IFG) and diabetic levels
- Explain the rationale behind glycated haemoglobin as an indicator of control status of diabetes mellitus
- Mention the normal glycated haemoglobin levels and interpret the given reports
- Describe the importance of measuring serum insulin and C-peptide in diabetic individuals
- Describe the importance of glycosuria among diabetic individuals
- Explain the importance of microalbuminuria among diabetic individuals
- Explain the derangement in lipid status among diabetes individuals

CHEMISTRY AND METABOLISM OF LIPIDS

BI4.1 Describe and Discuss main classes of lipids (essential/non essential fatty acids, cholesterol and hormonal steroids, triglycerides, major phospholipids and sphingolipids) relevant to human system and their major functions

- Define lipids and explain the biomedical importance of lipids in the body
- Classify lipids with examples
- Classify fatty acids with examples
- Mention the essential fatty acids and their significance in the body.
- Explain the biological importance of MUFA and PUFA
- Describe the composition and importance of triacylglycerol
- Classify phospholipids, mention their composition and biological significance of the various phospholipids
- Explain the biochemical defect, clinical features and diagnosis of respiratory distress syndrome.
- Mention the Composition and importance of glycolipids.
- Name the steroid ring present in Cholesterol & the biologically important products derived from cholesterol.

BI4.2 Describe the processes involved in digestion and absorption of Lipids and also the key features of their metabolism

- List the various dietary lipids
- Mention the sites and describe the role of various enzymes, hormones and bile salts in lipid digestion
- Explain the process and advantages of emulsification of fat and formation of micelles.
- Mention the end product of digestion of lipids, its absorption and transport into lymphatics and blood vessels
- Define steatorrhea and explain the causes and biochemical diagnosis of steatorrhea.
- Mention the sites and outline the synthesis of triacylglycerol in the body
- List the various lipases and explain their physiological and pathological importance
- Describe the mobilisation of depot fat from adipose tissue and the factors regulating it.
- Describe the role of carnitine in fatty acid oxidation and explain why small and medium chain fatty acids can be oxidised in carnitine deficiency
- Describe in detail oxidation, regulation and energetics of beta oxidation of fatty acids and mention the differences between the same and alpha, omega, peroxisomal and odd chain fatty acid oxidations
- Mention the metabolic defect and clinical effects associated with propionyl CoA carboxylase deficiency and methyl malonic aciduria, acyl CoA dehydrogenase, Translocase and Carnitine deficiency, Refsum's disease, Zellweger syndrome and organic acidurias
- Outline the synthesis of palmitic acid in the body
- Mention the advantages of the fatty acid synthase complex in the body. Mention other multienzyme complexes.
- Describe the desaturase and chain elongation system involved in fatty acid synthesis and explain why essential fatty acids cannot be synthesised by the body
- Differentiate between beta oxidation and synthesis of fatty acid
- Name the different ketone bodies and their importance.
- Mention the organ/tissue and subcellular location of synthesis of ketone bodies; describe the synthesis of the 3 ketone bodies.
- Mention the organs that utilise ketone bodies and explain the steps involved in its utilisation and the key enzyme required.
- Explain the biochemical basis for the signs and symptoms associated with ketoacidosis and the laboratory findings that help in the differential diagnosis and monitoring of this condition.
- Mention the biological importance of cholesterol in the body
- Mention the organ/tissue and subcellular location and describe the steps, enzymes involved in the synthesis of cholesterol (up to mevalonate in detail)
- Explain the significance of HMG CoA reductase in cholesterol synthesis and the effect of lipid lowering drugs.
- Differentiate between HMG CoA synthase, HMG CoA reductase and HMG CoA lyase enzymes

- Explain the short term and long term regulation of cholesterol synthesis with special emphasis on the effect of dietary cholesterol receptor mediated uptake of LDL cholesterol.
- Explain the formation of bile acids (primary and secondary) and bile salts as the end product of cholesterol metabolism and its entero hepatic circulation.
- Describe the formation of pulmonary surfactant
- Mention the lipid storage disorders and the biochemical defect associated with it
- Define and describe Fatty liver and its pathological effects
- Explain the effect of alcohol in development of fatty liver
- Differentiate between alcoholic fatty liver and non-alcoholic steatohepatitis (NASH)
- Mention the lipotropic factors and their role in fatty liver

BI4.3 Explain the regulation of lipoprotein metabolism and associated disorders

B14.4 Describe the structure and functions of lipoproteins, their functions, interrelations and relations with atherosclerosis.

- Describe the structure, composition and function of various Lipoproteins
- Classify the lipoproteins based on separation technique
- Describe the Formation and cellular uptake and the fate of Chylomicrons, VLDL, LDL and HDL.
- Explain the role of various apolipoproteins, CETP, LCAT, ACAT in the metabolism of lipoproteins
- Explain the role of lipoprotein lipase and the effect of Km on its tissue specific activity.
- Classify hyper and hypolipoproteinemias based on Frederickson's criteria, mention the biochemical defects associated and the laboratory findings
- Define Atherosclerosis – and explain the role of lipids in atherogenesis (oxLDL, Lp(a), Small dense LDL, HDL)
- Mention the important markers of atherosclerosis

BI4.5 BI 4.7 Interpret the laboratory results of analytes associated with metabolism of lipids

- Explain the various components of a Lipid profile
- Mention the biological reference intervals of total cholesterol, HDL, VLDL and Triglycerides as per current applicable (NCEP) guidelines
- Interpret the lipid profile and apolipoprotein analysis and arrive at the type of lipoprotein disorder.
- Mention other specific biochemical analytes associated with defects in metabolism of lipids (Ex MCAD levels in MCAD deficiency, propionyl CoA carboxylase and biotin levels in propionyl CoA carboxylase deficiency, urinary dicarboxylic acids in defective oxidation of fatty acid)

BI4.6 Describe the therapeutic uses of prostaglandins and inhibitors of eicosanoid synthesis

- Define Eicosanoids and differentiate prostaglandins, prostacyclins, thromboxanes and leukotrienes.
- List the important Prostaglandins and their source in the body
- Compare and contrast the biological actions of various prostaglandins
- Describe the therapeutic uses of prostaglandins in various conditions (Gastric ulcers, Bronchial asthma, hypertension, Induction of labour, PDA)
- Describe the action of anti-inflammatory drugs on PG synthesis
- Mention the biological importance of thromboxanes and leukotrienes

CHEMISTRY AND METABOLISM OF PROTEINS

BI5.1 Describe and discuss structural organization of proteins.

- Define amino acid
- Classify amino acid based on structure with examples
- Classify amino acid based on special groups and metabolic fate with examples
- Classify amino acid based on Nutritional with examples and List Essential, Semi essential amino acid
- Describe the relevance of Selenocysteine –the 21st amino acid
- Describe Isoelectric pH and its application
- List nonstandard amino acid with examples
- Describe peptide bond and its role in protein formation
- Describe Structural organization of proteins
- Describe primary, secondary, super secondary structures/ motifs, domains, tertiary and quaternary structures with appropriate examples. Describe Bonds stabilizing protein structure
- Describe process of denaturation and its application
- List method to determine primary, secondary, tertiary and quaternary structure of protein

BI5.2 Describe and discuss functions of proteins and structure-function relationships in relevant areas e.g. hemoglobin and selected hemoglobinopathies

- Classify the proteins based on functions (Structural, Hormonal, Catalytic, Transport with suitable examples)
- Classify plasma proteins and enumerate their function
- Describe specific functions and clinical significance of plasma proteins including Albumin, α , β and γ globulins.
- Define an Acute phase reactant including positive and Negative function and enumerate their clinical significance.
- Describe primary structure of insulin and how it influences the function of a protein.
- Describe α helix and beta -Pleated sheet and how it influences the secondary organization of protein.

- Describe structure of myoglobin and how it influences the functional(threedimensional)organization of protein.
- Describe structure of hemoglobin and how it influences the quaternaryorganization ofprotein.
- Classify abnormal hemoglobin with respect to their alteration in structure andfunctions with examples.
- Describe hemoglobinopathies.
- Describe biochemical basis and genetics of sickle cell anaemia and explain the basis of its clinical features, investigations and principles ofmanagement.
- Describe biochemical basis and genetics of thalassemia and explain the basis of its clinical features investigations and principles of management.
- Differentiate between adult and fetal haemoglobin and Analyze the results of haemoglobincomposition studies and use them to differentiate between the major hemoglobinopathies.

BI5.3 Describe the digestion and absorption of dietary proteins.

- List foodstuffs containing complete proteins.
- Describe process of digestion that occurs in different part of human gastrointestinal tract.
- Enumerate the various proteolytic enzymes involved in the digestion of proteins.
- Describe the absorption of digested amino acids into the cells.
- Describe the dynamics of the free amino acid pool.
- Discuss how the absorbed amino acids get transported in the circulatory system.
- Discuss how to treat diseases associated with protein digestion and absorption. BI5.4

Describe common disorders associated with protein metabolism.

- Describe the metabolic processes including Transamination, Deamination (Oxidative and nonoxidative) and their significance in degradation of proteins and amino acids.
- Describe sources and fate of ammonia including Trapping, Transport and Disposal of ammonia.
- Explain the basis of ammonia toxicity with clinical significance.
- Describe Significance, Site, reactions, key steps, energetics, regulation, and associated disorders of Urea cycle.
- Discuss disorders of urea cycle with respect to defective enzyme, clinical features, and treatment.
- Enumerate specialized products formed from Glycine and their importance.
- Discuss biochemical basis of Metabolic disorders of Glycine, Glycinuria and Primary hyperoxaluria.
- Outline the metabolic (Catabolic and anabolic) pathway of Phenylalanine and Tyrosine and discuss the synthesis of catecholamines and other specialised products formed and their importance
- Explain metabolic enzyme defect, clinical features, laboratory investigations and basis of treatment in Phenylketonuria, Tyrosinemia and Alkaptonuria.

- Outline the metabolism (Catabolic and anabolic) of Tryptophan and discuss the synthesis of serotonin, melatonin and other specialised products formed and their importance
- Explain biochemical basis, clinical features and basis of treatment in Carcinoid syndrome and Hartnup's disease.
- Outline the metabolism of Sulphur containing amino acids cysteine and methionine including their functions, synthesis of SAM, SAH, and Homocysteine and enumerate importance of trans methylation.
- Discuss biochemical basis of Cystinuria, Homocystinuria, their clinical features and treatment.
- Outline the metabolism of branch chain amino acid and its importance
- Discuss Metabolic defects of branched chain amino acids their clinical features and treatment including Maple syrup urine disease (MSUD)
- Describe Formation of Nitric oxide and its therapeutic importance.
- Define Polyamines and enumerate their clinical importance with examples.
- List important functions of and products formed from Histidine, Serine, Aspartate, Asparagine, glutamate, glutamine, serine, branched chain amino acids.
- Outline one carbon metabolism and describe its significance.

BI5.5 Interpret laboratory results of analytes associated with Metabolism of proteins

- Describe Inborn errors of metabolism of protein.
- Enumerate normal reference interval of blood urea and its importance in interpretation of kidney disease.
- Enumerate normal reference interval of ammonia and its importance in interpretation of urea cycle disorders and hepatic coma.
- Enumerate normal reference interval of phenyl alanine in blood and urine, its importance in laboratory diagnosis of PKU.
- Enumerate screening tests for PKU and Explain their significance including Guthrie test and ferric chloride test.
- Describe role of Paper and thin layer chromatographic in identification of Phenyl alanine, Tyrosine, Tryptophan, Glycine to detect inborn errors of amino acids.
- Enumerate normal reference interval of Homocysteine and its importance in Homocystinuria, myocardial infarction, stroke and pulmonary embolism.
- Enumerate normal reference interval of dopamine, nor epinephrine (noradrenaline), epinephrine (adrenaline) and significance of VMA in interpretation of Pheochromocytoma.
- Discuss excretion of 5-hydroxy indole acetate in urine in carcinoid syndrome and its interpretation in laboratory diagnosis.
- Enumerate normal reference interval of branch chain amino acids and its role in diagnosis of maple syrup urine disease.
- Enumerate techniques used to separate and identify amino acids and proteins including their principle including chromatography and electrophoresis.
- List Biological Reference range of serum total protein, albumin, total globulin, C reactive protein and enumerate the causes of their increased and decreased levels.
- Discuss approach to the Laboratory investigation of Multiple Myeloma.

METABOLISM AND HOMEOSTASIS

BI6.1 Discuss the metabolic processes that take place in specific organs in the body in the fed and fasting states.

- Describe metabolic adaptations/stages under well fed state, fasting and starvation
- Describe metabolic adaptations during re feeding after prolonged starvation
- Describe metabolic profile of brain, adipose tissue, skeletal muscle, cardiac muscle and liver during well fed state and fasting
- Explain relative changes of important parameters during starvation
- Mention the effects of exercise on metabolic profile
- Explain feed fast cycle/starve feed cycle
- List the location of adipose tissue, its cells and functions, name the types of adipose tissue.
- List the features of White Adipose Tissue (WAT)
- Describe the metabolism of adipose tissue in fed and fasting states
- Define adipokines giving examples and briefly describe the clinical significance of each.
- State the features & metabolism of Brown adipose tissue.
- State the significance of blood sugar regulation
- Name the Factors that add and remove glucose from the blood
- Define Renal threshold & state the importance of SGLT transporters
- Describe the Regulation of blood glucose during Post prandial and fasting states
- State the physiological effects of Insulin, Glucagon & other hyperglycemic hormones
- State the Blood glucose cut-offs & terminologies - normo, hypo, hyper glycemia & glucose tolerance
- Define Diabetes Mellitus & classify
- State the WHO Criteria for diagnosis of Diabetes Mellitus
- Differentiate the features of Type 1 & 2 Diabetes Mellitus
- Describe the Metabolic derangements in DM & biochemical basis of the same
- List the laboratory investigations done in a patient of DM

CHEMISTRY OF NUCLEIC ACIDS AND NUCLEOTIDE METABOLISM

BI6.2: Describe and discuss the metabolic processes in which nucleotides are involved

- Name the Purines and Pyrimidines
- Distinguish the chemical structure of the various Purines and Pyrimidines
- Explain the structure of Nucleosides and Nucleotides
- List the properties of nitrogenous bases/ nucleosides /Nucleotides
- Enumerate the functions of Nucleotides.
- Explain the importance of cAMP, cGMP, SAM, PAPS
- Enumerate the guanosine, uridine and cytidine derivatives and their function
- Enumerate the synthetic nucleotide analogues and their therapeutic importance
- Name the carbon and nitrogen sources in purine and pyrimidine ring

- Explain purine Salvage pathways and its importance
- Explain pyrimidine Salvage pathways and its importance
- Describe the degradation pathway of Purine nucleotides
- State the reference range of serum and urinary uric acid
- Enumerate the end products of pyrimidine catabolism and their Significance

BI6.3 Describe the common disorders associated with nucleotide metabolism.

- Discuss the, manifestation and biochemical basis of Lesch Nyhan Syndrome.
- Classify Gout and enumerate the causes of Gout
- Discuss the biochemical basis for severe combined immune deficiency Disorder

BI6.4 Discuss the laboratory results of analytes associated with gout & Lesch Nyhansyndrome

- State the reference range of serum and urinary uric acid in male and Female
- State the normal urate pool and its daily turnover
- Define Hyperuricemia and enumerate its causes
- Interpret the laboratory results of a patient suspected with gouty Arthritis

VITAMINS

BI6.5 Describe the biochemical role of vitamins in the body and explain the manifestation of their deficiency

- Define the role of vitamins in health and disease
- Classify vitamins and enumerate all the vitamins in each class
- Differentiate the characteristics of water soluble and fat soluble vitamins
- Describe the structure and chemistry of vitamers of vitamin A and provitamin A
- List the sources of Vitamin A and beta carotene and RDA of vitamin A in adults and children
- Discuss the digestion, transport and storage of vitamin A, functions of vitamin A & Wald's visual cycle with the help of a neat labeled diagram
- Discuss the different stages of deficiency manifestations of vitamin A
- State the common manifestations of hypervitaminosis A
- Enumerate the therapeutic uses of vitamin A
- State the provitamin forms of vitamin D
- List the sources of Vitamin D and RDA of vitamin D in adults and children
- Discuss the synthesis of vitamin D and its conversion to its active form Calcitriol accurately
- Enumerate the reasons to justify Vitamin D is a hormone
- Discuss the role of Calcitriol on calcium and phosphorus metabolism with reference to mineralization of bones
- Name the deficiency disorder of Vitamin D in children and adults
- Discuss the causes and deficiency manifestation of Rickets

- Define renal rickets, vitamin D dependent rickets and Hypophosphatemic rickets
- Enumerate the extra skeletal functions of calcitriol
- Name the structure and different forms of vitamin E
- Discuss the role of alpha tocopherol as an antioxidant with special reference to its role as a chain breaking antioxidant in lipid peroxidation
- Describe the biochemical functions of Vitamin E
- List the rich and moderate sources and RDA of Vitamin E
- Describe the deficiency manifestation of Vitamin E
- Name the structure and different forms vitamin K
- List the rich and moderate sources and RDA of vitamin K
- Describe the biochemical functions of vitamin K
- Describe the deficiency manifestation of vitamin K
- Enumerate the common manifestations of Hypervitaminosis K
- Name the ring structure and coenzymes Thiamine
- List the rich and moderate sources and RDA of Thiamine
- Describe the major biochemical functions of Thiamine
- Relate the function of TPP with carbohydrate metabolism
- Describe the deficiency manifestation of Thiamine
- Classify and distinguish the different types of Berberi accurately
- Enumerate the antagonists of Thiamine
- Name the ring structure and coenzymes of Riboflavin
- Illustrate the formation of FMN and FAD
- List the common sources and RDA of Riboflavin
- Describe the major biochemical functions of Riboflavin giving examples of different metabolic reactions in which FMN and FAD participate
- Describe the deficiency manifestation of Riboflavin
- Enumerate the antagonists of Riboflavin
- Name the ring structure and coenzymes of Niacin
- List the common sources and RDA of Niacin
- Describe the biochemical functions of Niacin coenzyme NAD⁺/NADH giving an example each in carbohydrate, lipid and amino acid metabolism
- State at least two reactions each of generation and utilization of NADP⁺ and NADPH respectively
- Enumerate the causes of Niacin deficiency
- Describe the deficiency manifestation of Niacin
- Enumerate the Therapeutic uses and toxicity of Niacin
- Name the components of Pantothenic acid structure
- Enumerate the Coenzyme derivatives of pantothenic acid
- Discuss the importance of acetyl CoA and Succinyl CoA pool
- State the sources, RDA and deficiency manifestations of pantothenic acid
- Name the ring structure and different forms and coenzyme of Pyridoxine
- List the common sources and RDA of Pyridoxine
- Describe the biochemical functions of Pyridoxine with special reference to role of PLP in amino acid metabolism

- Describe the deficiency manifestation, therapeutic uses and toxicity manifestations of Pyridoxine
- Name the components in structure of Biotin
- List the common sources and RDA of Biotin
- Describe the biochemical functions of Biotin
- Mention the biotin independent reactions
- State the deficiency manifestations of Biotin
- State the role of Avidin - Biotin in clinical assays
- Mention the components in structure of Folic acid
- Illustrate the formation of THF
- List the common sources and RDA of Folic acid
- Discuss the role of folic acid in one carbon metabolism
- Describe the deficiency manifestation of Folic acid
- List the tests to assess the Folic acid deficiency status
- Enumerate the antifolate drugs and their therapeutic uses
- Name the ring structure with its components and co enzyme form of vitamin B12
- List the common sources and RDA of Vitamin B12
- Discuss the digestion and absorption of Vitamin B12 emphasizing the role of intrinsic factor of stomach
- Describe the functions of Vitamin B12 stating the reaction in which methyl and adenosyl cobalamin participate
- Describe the biochemical basis and deficiency manifestation of Vitamin B12 and tests to assess the Vitamin B12 deficiency status
- Discuss the chemistry of vitamin C
- List the common sources and RDA of vitamin C
- Enumerate the biochemical functions of vitamin C
- Describe the deficiency manifestation of vitamin C
- Enumerate the therapeutic uses of vitamin C
- Enumerate the vitamin like substances and mention their structure and function

BIOLOGICAL OXIDATION

BI6.6 Describe the biochemical processes involved in generation of energy in cells.

- Define primary, secondary /intermediary and tertiary metabolism/internal respiration/cellular respiration.
- Define substrate level and oxidative phosphorylation and enumerate its sites and examples.
- Define high energy compounds and enumerate its examples.
- Describe the organization, components and flow of electrons in electron transport chain
- Explain the chemiosmotic theory.
- Describe the binding change mechanism of ATP synthesis by ATP synthase.
- Explain the regulation of ATP synthesis by oxidative phosphorylation.
- Enumerate the inhibitors of electron transport chain and oxidative phosphorylation,

- Define uncouplers and enumerate its examples.
- Describe the role of brown adipose tissue in thermogenesis

ACID BASE BALANCE, WATER AND ELECTROLYTE BALANCE

BI6.7 Describe the processes involved in maintenance of normal pH, water & electrolyte balance of body fluids and the derangements associated with these.

- Enumerate the functions of water.
- Outline the distribution of water in various body compartments.
- Explain the principles of water balance by considering water inputs, sources and water output process.
- Explain the various regulatory mechanisms by which water balance is maintained.
- Illustrate the distribution of electrolytes in various body compartments
- State the serum reference range for measured electrolytes; sodium, potassium, chloride and bicarbonate
- Describe the concepts of osmolality, plasma osmolality and effective osmolality
- Describe the hormonal regulation of water and electrolyte balance
- Discuss the role of Renin – Angiotensin system in regulation of water and electrolyte balance
- Discuss the causes, pathophysiology and biochemical alterations in conditions of dehydration and over hydration
- Explain the composition and basis of dehydration management with ORS
- Discuss briefly the causes, pathophysiology and manifestations of dehydration
- Define acids and bases
 - Discuss importance of Henderson Hasselbalch's equation
 - Define buffer, buffering capacity and its significance
 - Classify buffers in the body and plasma
 - Explain role and mechanism of bicarbonate buffer system in maintenance of pH
 - Explain the role of phosphate buffer system and protein buffer system in maintenance of pH
- Explain the role of respiratory system in maintaining acid balance
- Explain the isohydric transport of CO₂ in blood
- Highlight the importance of renal system in maintaining acid balance
- Discuss the key mechanisms by which kidneys help in maintaining acid base balance
- Define titrable acidity
- Highlight the importance of glutaminase and ammonia in buffering acid-base balance.
- Classify acid base disorders based on the metabolic/ respiratory component and pH
- Describe the causes, pathophysiology and compensatory mechanisms in metabolic acidosis
- Define Anion gap and write its reference range

- Classify metabolic acidosis based on anion gap giving at least three causes in each type
- Describe the causes, pathophysiology and compensatory mechanisms in metabolic Alkalosis
- Classify metabolic alkalosis based on urinary chloride levels
- Recognize the relationship between serum potassium and metabolic Alkalosis
- Describe the causes, pathophysiology and compensatory mechanisms in Respiratory acidosis
- Describe the causes, pathophysiology and compensatory mechanisms in Respiratory alkalosis

BI6.8 Discuss and interpret results of Arterial Blood Gas (ABG) analysis in various disorders

- Discuss the role of Arterial Blood Gas (ABG) analysis in diagnosing various acid base disorders / Explain the application of ABG analysis in clinical practice
- Interpret results of Arterial Blood Gas (ABG) analysis data in the given cases

MINERALS

BI6.9 Describe the functions of various minerals in the body, their metabolism and homeostasis

- ☐ Define major minerals and microminerals.
- ☐ Enumerate RDA, dietary sources, functions, biological reference interval of calcium and phosphorus.
 - ☐ Explain distribution in the body, transport across cells, absorption and regulation of metabolism of calcium and phosphorus.
 - ☐ Enumerate RDA, dietary sources, functions, proteins containing iron in the body, transport and storage forms of iron.
 - ☐ Explain distribution in the body, transport across cells, absorption, mucosal block theory of iron absorption and regulation of metabolism of iron.
 - ☐ Enumerate functions, proteins containing and dietary sources of Copper, Zinc, Selenium, Magnesium and other trace elements like, iodine, nickel, molybdenum and chromium.
 - ☐ Enumerate functions, dietary sources, RDA and biological reference interval of sodium, potassium and chloride.

BI6.10 Enumerate and describe the disorders associated with mineral metabolism

- ☐ Enumerate the signs and symptoms, laboratory investigations and disorders associated with metabolism of calcium, phosphorus, iron, sodium and chloride
- ☐ Describe the biochemical basis of signs and symptoms of disorders associated with metabolism of calcium, phosphorus, iron, sodium and chloride
- ☐ Interpret the mineral status of calcium, phosphorus, iron, sodium and chloride in normal people and in associated disorders using laboratory investigations
- ☐ Enumerate the disorders associated with Copper, Zinc, Selenium, Magnesium & other trace elements like, iodine, nickel, molybdenum and chromium

HAEM METABOLISM

BI6.11 Describe the functions of haem in the body and describe the processes involved in its metabolism and describe porphyrin in metabolism.

- List the functions of haem and haem containing compounds.
- Describe the biosynthesis and regulation of haem synthesis
- Enumerate and classify disorders of haem metabolism, associated porphyrias and the respective enzyme defects
- Describe the associated features and diagnosis of porphyria (Hereditary porphyria and acquired porphyria)
- Describe catabolism of haem including generation of bilirubin, transport to liver, and conjugation in liver, excretion of bilirubin in bile and enterohepatic circulation.

BI6.12 Describe the major types of haemoglobin and its derivatives found in the body and their physiological/ pathological relevance.

- Describe the structure of hemoglobin including assembly of polypeptide chain and explain the structure function relationships.
- List the function of hemoglobin
- Explain Transport of oxygen, carbon dioxide and protons by hemoglobin Bohr effect and Role of 2,3BPG.
- Enumerate major types of hemoglobin and the normal levels in blood of adults, neonates and children including HbA, HbA₂, HbF and others
- Describe the difference in polypeptide composition of HbA, HbA₂ and HbF
- Enumerate Normal & Abnormal hemoglobin derivatives
- Explain what are carboxy-hemoglobin, methemoglobin, sulf-hemoglobin and glycated hemoglobin and their clinical relevance
- Describe the genesis and molecular pathology of hemoglobinopathies and thalassemias.
- Enumerate the sickle cell anemia, thalassemia and other hemoglobin variants
- Explain the pathophysiology and laboratory diagnosis of thalassemia and hemoglobinopathies
- Define and classify anemia.
- Enumerate the functions of myoglobin

ORGAN FUNCTION TESTS

BI6.13 Describe the function of the kidney, liver, thyroid and adrenal glands

- Enumerate functions of kidney, liver, thyroid and adrenal glands.
- Describe the role of kidney in excretion of metabolic wastes, maintaining water and electrolyte balance, activation of Vitamin D and synthesis of erythropoietin.

- Define GFR – Glomerular filtration rate
- Explain the role of glomerular filtration barrier in urine formation
- Describe role of liver in biochemical functions, including synthesis of plasma proteins, cholesterol, triacylglycerol and lipoprotein synthesis
- Describe role of liver in metabolism involving carbohydrates, ketogenesis, protein catabolism and TCA cycle, storage of fat soluble vitamins.
- Describe role of liver in detoxification including ammonia, bilirubin, cholesterol, and drug metabolites
- Explain synthesis, regulation and secretion of thyroid hormones using hypothalamus-hypophyseal-thyroid axis.
- Describe metabolic effects of thyroid hormone including calorogenic effect, Basal metabolic rate, involvement in protein synthesis and protein catabolism, involvement in carbohydrate and fatty acid metabolism
- Explain synthesis, secretion, transport and metabolism of adrenal cortical hormones and adrenal medullary hormones
- Describe Biological effects of Adrenal hormones including glucocorticoids, gonadal hormones and catecholamines as neurotransmitters

BI6.14 Describe the tests that are commonly done in clinical practice to assess the function of these organs (kidney, liver, thyroid and adrenal glands)

- Classify renal function tests, liver function tests, thyroid function tests and adrenal function tests.
- Enumerate the physical properties, normal and abnormal constituents of urine
- Enumerate the tests performed to assess the physical properties, normal and abnormal constituents of urine
- Define clearance and renal threshold
- Classify clearance tests
- Explain the relationship of GFR with clearance
- Describe the procedure of clearance test and formulae to calculate clearance (endogenous creatinine/urea clearance test, inulin clearance test)
- Enumerate the advantages and disadvantages of clearance tests (endogenous creatinine/urea clearance test, inulin clearance test)
- Explain the role of cystatin C as glomerular filtration marker
- Enumerate the markers of glomerular permeability
- Enumerate tubular function tests and describe their procedure (specific gravity, measurement of osmolality, concentration test, dilution test, urinary acidification test)
- Enumerate the immunological tests in renal disease
- Explain the clinical relevance of van Den Bergh reaction, serum total and direct bilirubin, urinary bilirubin and urobilinogen, serum total protein, albumin, A:G ratio, enzymes including AST, ALT, ALP, GGT, prothrombin time, blood ammonia, Special tests include ceruloplasmin, ferritin, alpha1 antitrypsin in diagnosis of liver diseases.
- Enumerate the markers of excretory function, liver injury, cholestasis, chronic liver

disease.

- Explain the clinical relevance of assay of thyroid hormones T3, T4, fT3, and fT4, plasma TSH, TRH response test and thyroid autoantibodies like anti TPO, serum hormones in thyroid diseases.
- Explain the clinical relevance of tests for adrenal functions including cortisol (morning and evening), urinary free cortisol, ACTH, ACTH stimulation test, 17 – hydroxy progesterone, testosterone adrenal disease.

BI6.15 Describe the abnormalities of kidney, liver, thyroid and adrenal glands

- Define and enumerate the causes of uremia, azotemia, polyuria, oliguria, anuria, isosthenuria, hematuria, hemoglobinuria, proteinuria, microalbuminuria, glycosuria and explain their clinical relevance.
- Define acute renal failure and chronic renal failure
- Explain the grading of chronic kidney disease based on GFR
- Describe the salient clinical features of nephritic syndrome and nephrotic syndrome
- Enumerate different types of renal stones and their cause
- Define, classify and enumerate salient features and laboratory investigations of jaundice
- Differentiate prehepatic, hepatic and post hepatic jaundice using salient features and laboratory investigations
- Enumerate the causes of congenital and acquired hyperbilirubinemia
- Enumerate the salient features of hepatitis, cholestasis, cirrhosis of liver, alcoholic liver disease, non-alcoholic fatty liver disease, Reye syndrome.
- Enumerate the causes and explain the salient features of primary and secondary causes of hyperthyroidism, hypothyroidism.
- Enumerate the causes and explain the salient features of Adrenal gland-dysfunction including Cushing's disease, Addison's disease, Conn's syndrome, pheochromocytoma.

MOLECULAR BIOLOGY

BI7.1 Describe the structure and functions of DNA and RNA and outline the cell cycle.

- Enumerate the functions of DNA.
- Describe the structure of Watson and Crick model of DNA with the help of a neat labelled diagram
- Enumerate different forms of DNA and their differences
- Define T_m or melting temperature of DNA
- Enumerate the difference between DNA and RNA
- Illustrate cell cycle with the help of a neat labelled diagram
- Recognize the phase where replication occurs in cell cycle
- Describe the structure and function of mRNA
- Describe the function structure of tRNA with the help of a neat labeled diagram
- Compare and Contrast the difference between prokaryotic and eukaryotic ribosomes

BI7.2 Describe the processes involved in replication & repair of DNA and the transcription & translation mechanisms

- Define Replication
- Enumerate at least four salient features of Replication
- Discuss the role of various proteins in DNA replication process
- Describe the replication process in prokaryotes with the help of a neat labelled diagram
- Illustrate the Okazaki fragment formation with the help of a neat labelled diagram
- Enumerate the different types and functions of eukaryotic DNA Polymerases
- Discuss replication Process in Eukaryotes with the help of a neat labelled diagram
- Enumerate at least three inhibitors in each of prokaryotic and eukaryotic replication process
- Highlight the importance of Telomerase in health and disease condition
- List the DNA repair mechanisms
- Discuss Mismatch repair mechanism with the help of a neat labeled diagram and its significance
- Discuss base excision repair mechanism with the help of a neat labeled diagram and its significance
- Discuss Nucleotide repair mechanism with the help of a neat labeled diagram and its significance
- Define Transcription
- Enumerate the similarities and differences between Replication and Transcription
- Discuss the DNA templates and prokaryotic enzyme for Transcription process
- Discuss the importance of Promoter region in initiation and regulation of transcription process
- Describe transcription in Prokaryotes with the help of a neat labeled diagram.
- Enumerate the differences between prokaryotic and eukaryotic Transcription
- Discuss Transcription process in Eukaryotes with the help of a neat labelled diagram.
- Discuss the posttranscriptional modifications in hnRNA with the help of a neat labelled diagram.
- Discuss the post transcriptional modifications in, tRNA with the help of a neat labelled diagram.
- Discuss the post transcriptional modifications in rRNA
- State the role of Ribozymes giving at least two examples
- Discuss the role of reverse transcriptase in synthesis of cDNA.
- Enumerate the inhibitors of transcription process in prokaryotes and eukaryotes and state their significance
- Define codon
- Discuss the organization of genetic code
- Name the initiator and terminator codons
- Discuss the characteristic features of Genetic Code
- Define translation process
- Enumerate all the requirements of protein biosynthesis
- Illustrate the formation of charged tRNA
- Discuss the initiation of protein biosynthesis with the help of a neat labelled diagram.

- Describe the elongation step of protein biosynthesis with the help of a neat labelled diagram.
- Describe the termination step of protein biosynthesis with the help of a neat labelled diagram.
- Discuss the mechanism of inhibitors of protein biosynthesis in both prokaryotes and eukaryotes
- Define and state the importance of polysomes
- Discuss the common mechanisms of protein targeting to various destination and associated disorder with example of I cell disease and others.
- Discuss the co and post translational modifications in protein biosynthesis process
- Describe briefly Protein folding mechanism and role of Chaperones and Heat shock proteins and associated disorders Alzheimer's disease, Prion diseases
- Discuss briefly mitochondrial DNA, genes and related disorders

BI7.3 Describe gene mutations and basic mechanism of regulation of gene Expression

- Observe the estimation of SGOT, SGPT and ALP and interpret the results in given sample accurately
- Define Mutation
- Classify point mutations based on the type of nucleotide altered
- Categorize point mutations based on consequence citing examples
- Explain the frameshift mutations and its consequences in protein Biosynthesis
- State the importance of regulation of gene expression
- Discuss the types of gene regulation in prokaryotes
- Explain the gene expression in Prokaryotes giving example of Lac Operon
- Explain the concept of intron, exon, cistron and Gene
- Enumerate at least four types of gene regulation in Eukaryotes
- Explain briefly the role of transcriptional activators and co-regulators.
- Explain the gene amplification mechanism in regulation of gene expression in Eukaryotes
- Illustrate gene rearrangement mechanism in Antibody synthesis
- Discuss briefly gene regulation at RNA level
- Explain gene silencing by RNA interference (RNAi) in regulation of gene expression
- Highlight the concepts of epigenetics in regulation of gene expression
- Briefly explain the concepts of Concept of Genomics, proteomics and Metabolomics

MOLECULAR BIOLOGY TECHNIQUES AND GENE THERAPY

BI7.4 Describe applications of molecular technologies like recombinant DNA technology, PCR in the diagnosis and treatment of diseases with genetic basis

- Define Recombinant DNA technology
- Define Hybrid / chimeric/ Recombinant DNA
- Discuss on Restriction Endonucleases and their role in recombinant DNA technology
- List and Explain the role of vectors in recombinant DNA technology
- Explain plasmids and their role in recombinant DNA technology

- Enumerate the host cells and process of DNA transfer into host cells in recombinant DNA technology
- Explain the process of recombinant DNA technology using plasmid as vector
- Discuss the construction of Genomic Library and its clinical significance
- Explain the formation of cDNA and construction of cDNA library
- Define and illustrate the role of DNA Probes
- Enumerate the applications of Recombinant DNA technology
- emphasizing on its application in field of Medicine
- Define and discuss the process of Polymerase Chain Reaction
- Enumerate the applications of Polymerase Chain Reaction
- Explain Southern Blot technique and state its applications
- State the importance of Northern blot technique
- State the importance of Western blot technique
- Explain briefly DNA microarray technique and its applications
- Enumerate the DNA markers; SNP, VNTRs, RFLP and state their importance
- State the importance of RFLP and write any two of its applications
- Explain the basis of DNA fingerprinting/DNA Profiling with the help of neat labelled diagram.
- Define and classify gene therapy
- Explain the vectors used in gene therapy
- Discuss the process of gene therapy giving example of gene therapy in SCID
- Discuss role of gene therapy in cancer treatment
- Discuss the therapeutic role of RNAi (RNA interference) / Antisense and Antisense therapy in cancer treatment
- Give an overview of Human Genome Project (HGP)

XENOBIOTICS AND DETOXIFICATION

BI 7.5 Describe the role of xenobiotics in disease

- Define xenobiotics and biotransformation
- List the common xenobiotics
- Mention the biological damage caused by xenobiotics (e.g.: mutagenic, carcinogenic, allergenic) and the disease associated (Ex Cancer, teratogenic condition due to exposure to pesticides)
- Describe the phase 1 and phase 2 reactions involved in the metabolism of xenobiotics
- Explain other detoxification reactions such as reduction, hydrolysis, acetylation, methylation and reduction other detoxification reactions
- Explain the significance of cytochromes in detoxification
- Describe the metabolic consequences of alcoholism

FREE RADICALS AND ANTIOXIDANTS

BI7.6 Describe the anti-oxidant defence systems in the body.

- Define Antioxidants, Classify antioxidants
- Explain enzymatic antioxidants and their significance
- Explain the role of Vitamin E as an antioxidant

- Explain the importance of Nutrient and Metabolic antioxidants

BI7.7 Describe the role of oxidative stress in the pathogenesis of conditions such as cancer, complications of diabetes mellitus and atherosclerosis

- Define Free Radicals and Reactive Oxygen Species (ROS) and list the different types of free radicals
- Explain the different reactions and mechanisms involved in production of free radicals
- Explain the free radical damage to various biomolecules with special reference to lipid peroxidation
- Discuss the role of oxidative stress in pathogenesis of inflammatory disorders, respiratory disorders and cataract
- Describe the role of oxidative stress in the pathogenesis of cancer
- Describe the role of oxidative stress in the pathogenesis of complications of diabetes mellitus
- Describe the role of oxidative stress in the pathogenesis of atherosclerosis
- Mention the test to measure oxidative stress in serum

NUTRITION AND DIETETICS

BI8.1 Discuss the importance of various dietary components and explain importance of dietary fibre.

List the important dietary components of food

Define calorific value of food and list the calorific value of carbohydrate, protein and fat. List the sources, recommended daily intake and types of dietary carbohydrates

Discuss about the major dietary polysaccharide and cane sugar with their clinical importance

□ Define dietary fibre and their requirement per day and list the dietary fibres with examples

Enumerate the physiological effect of dietary fibre and their clinical importance

List the sources, different types of dietary fat and recommended daily intake

List the different sources of cholesterol and the clinical importance of cholesterol. Discuss about polyunsaturated fatty acids, essential fatty acids

List the sources of dietary protein and recommended daily intake of protein. Discuss about essential amino acids

Define nitrogen balance and enumerate their types. Enumerate the factors affecting nitrogen balance

List the indices used to assess the nutritional value of protein and add a note on amino acid score

□ Discuss about limiting amino acid and mutual supplementation

BI8.2 Describe the types and causes of protein energy malnutrition and its Effects

Classify protein energy malnutrition

Enumerate the causes for protein energy malnutrition

□ Describe aetiology, clinical features, investigation and treatment of kwashiorkor and add a note on biochemical mechanism underlying the disease

□ Describe aetiology, clinical features, investigation and treatment of marasmus and add a note on biochemical mechanism underlying the disease

Differentiate between kwashiorkor and marasmus Discuss

marasmic kwashiorkor and its sequelae Discuss about treatment of

protein energy malnutrition Define and list the causes of cachexia

due to diseases

BI8.3 Provide dietary advice for optimal health in childhood and adult, in disease conditions like diabetes mellitus, coronary artery disease and in pregnancy

Define respiratory quotient and list the RQ of carbohydrate, fat, protein and mixed diet.

Define Basal Metabolic Rate, list the factors affecting BMR, different types of measurements of BMR and normal value of BMR

Describe Specific Dynamic Action (SDA)

List the different types of physical activity and add a note on energy requirement of different physical activity

List the components of balanced diet Discuss about

food guide pyramid

Discuss the general principles of prescribing a diet based on body weight, protein requirement, calorie requirement and SDA and importance of prescribing a diet Describe the

different steps of prescribing the diet for a 60kg sedentary man

Describe glycemic index with reference meal as 50gram of glucose and list the glycemic index of common foods

□ Describe the different steps of prescribing the diet for diabetic patient with respect to glycemic index and add a note on dietary guidelines to be followed by the diabetic patient

□ Describe the different steps of prescribing the diet for cardiac patient and add a note on

dietary guidelines to be followed by the cardiac patient

Describe the different steps of prescribing the diet for pregnant ladies Discuss about

total parenteral nutrition

BI8.4 Describe the causes (including dietary habits), effects and health risks associated with being overweight/ obesity

Define obesity with respect to body mass index (BMI)

List the causes for overweight and obesity including genetic causes for obesity Discuss

about regulators of appetite

Describe the different steps of prescribing the diet for overweight and obese individual and add a note on Atkin's diet

Enumerate the ill effects associated with overweight and obese

Discuss the steps to be followed for prevention and treatment of overweight and obese

BI8.5 Summarize the nutritional importance of commonly used items of food including fruits and vegetables (macro-molecules & its importance)

List the common food items of Indian population and their ratio in diet

Discuss cereals and millets are the major sources of energy and their nutritional value

Discuss about mutual supplementation of cereals and pulses
 Discuss, milk is a complete protein
 Discuss, egg is the reference protein
 Discuss the nutritional importance of fruits and vegetables
 Discuss, water is the essential nutrient of life

EXTRACELLULAR MATRIX

BI9.1 List the functions and components of the extracellular matrix (ECM).

- List the functions of extracellular matrix
- Enumerate the different components of ECM
- Describe the structure of collagen
- Describe the structure and functions of mucopolysaccharides
- Explain the role of mucopolysaccharides in formation of extracellular matrix
- Enumerate the functions of Proteoglycans in extracellular matrix
- Explain briefly the role of non-collagen proteins in extracellular matrix formation
- Explain the role of Laminin, Elastin and Fibronectin

BI9.2 Discuss the involvement of ECM components in health and disease.

- Enumerate the various genetic disorders from abnormalities in the synthesis of collagen
- Discuss briefly the pathophysiology of Ehler-Danlos syndrome, Marfan syndrome, Alport syndrome
- Explain the alterations of ECM components in osteoarthritis or rheumatoid arthritis

BI9.3 Describe protein targeting & sorting along with its associated disorders.

- Discuss briefly the co-translational and post translational modification of proteins in endoplasmic reticulum resulting in sorting of proteins
- Discuss the mechanism involving signal sequences by which proteins are targeted to a specific destination
- Explain the role of Golgi apparatus in protein glycosylation and protein sorting
- Discuss the role of Chaperones and chaperonin system in protein folding
- State the disorders associated with defective protein targeting
- Discuss briefly the pathophysiology of Zellweger syndrome, Refsum's disease and I-cell disease

BIOCHEMISTRY OF CANCER

BI10.1 Describe the cancer initiation, promotion, oncogenes & oncogene activation. Also focus on p53 & apoptosis

Define cancer and enumerate the causes of cancer including physical, chemical, genetic, biological
 Explain different types of cell signaling including G protein coupled signaling, catalytic receptor signaling, steroid receptor signaling with suitable examples of hormones and growth factors
 Elaborate the role of mutagens and antimutagens in etiology of cancer
 Explain the action of oncogenes and anti oncogenes.

Describe the role of Oncogenic viruses and associated cancer.

Explain biochemical functions of oncogenes, proto-oncogenes and onco-suppressorgenes Compare characteristic features of tumor cells with normal cell

Elaborate the role of cell cycle, abnormal cell growth and programmed cell death (apoptosis) in causing cancer

Describe activation of oncogenes including point mutation of protooncogene and insertional mutagenesis

Describe protective action of onco suppressor gene including p53, RB gene and effects of loss of its action.

Explain apoptosis including requirement for apoptosis, apoptosis mediating gene, apoptosis protecting gene and mechanism of apoptosis

BI10.2 Describe various biochemical tumor markers and the biochemical basis of cancer therapy.

Define and classify tumor markers with suitable examples

Enumerate diagnostic and prognostic application of tumor markers including their elevation in benign and malignant conditions

□ Explain the biochemical basis of cancer therapy, anticancer drugs and mode of action including alkylating agents, antimetabolites, topoisomerase inhibitors, antibiotics, hormones, receptor blockers, radiotherapy, hybridoma technology, monoclonal anti, body and their application

IMMUNOLOGY

BI10.3 Describe the cellular and humoral components of the immune system & describe the types and structure of antibody

Describe the central and peripheral lymphoid organs

Describe briefly the cells of the lymphoreticular system and their role in cell-mediated immune response.

Describe the role of T-helper cells in immune responses

Describe the structure and functions of different types of antibody Describe immunoglobulin class switching

BI 10.4 Describe and discuss innate and adaptive immune response, self/nonself recognition and the central role of T helper cells in immune response

Describe innate and adaptive immune response Describe the role of

T-helper cells in immune responses

Define an antigen and discuss the various determinants of antigenicity Describe the concept of self/non-self antigens

Describe the concepts of immune tolerance and autoimmunity Mention the basis for graft versus host rejection

BI 10.5 Describe antigens and concepts involved in vaccine development

Define and describe the different types of vaccines Describe the immunological basis of vaccine development

Compare active and passive immunization
Mention the various phases in vaccine development

PRACTICALS

Topic: Biochemical Laboratory Tests Number of competencies: (24) Number
of procedures that require certification: (05)

BI11.1 Describe commonly used laboratory apparatus and equipment, good safe laboratory practice and waste disposal.

List commonly used laboratory glassware and equipments. Indicate commonly used laboratory glassware and equipments. Describe Good and safe laboratory practices.
Explain the current guidelines for Biomedical waste disposal

BI11.2 Describe the preparation of buffers and estimation of pH.

Define buffers, molarity, normality, molar solution, normal solution, percentage solution. Identify the uses of at least 4 buffers in biochemistry laboratory.
Describe the method to prepare at least two commonly used buffers in Biochemistry laboratory.
Describe the importance of HH equation in determination of pH. Describe the principle, parts and uses of pH meter.
Explain the procedure to estimate pH using pH meter.
Observe the estimation of pH of different buffers using pH meter

BI11.3 Describe the chemical components of normal urine.

- ☐ List the chemical components of normal urine categorising under organic and inorganic constituents
- ☐ List the chemical tests to be performed to detect organic and inorganic components of normal urine
- ☐ Explain the principles of all the chemical tests listed to detect organic and inorganic components of normal urine

Describe the clinical significance of organic constituents of normal urine. Describe the clinical significance inorganic constituents of normal urine.
Interpret the physiological and pathological variations in organic and inorganic constituents of urine

BI11.4 Perform urine analysis to estimate and determine normal and abnormal constituents

- ☐ Describe the ways of urine sample collection and the preservatives used.

☐ Describe the physical properties of urine for volume, colour, odour, Specific gravity under normal physiological conditions.

☐ Describe the physical properties of urine for colour, odour, appearance, pH, Specific gravity in abnormal/diseased conditions.

Describe the abnormal constituents of urine in different diseases conditions.

Perform the physical analysis of normal urine for colour odour and appearance by observation. Estimate the pH of given urine sample using pH paper correctly by comparison of colour change by visual analysis.

☐ Estimate the specific gravity of given urine sample using urinometer correctly with temperature correction

☐ Perform urine analysis to determine at least 3 organic and 3 inorganic constituents of normal urine by chemical tests according to the given procedure.

List the common abnormal constituents of urine.

List the chemical tests to be performed to detect abnormal constituents of urine. Describe the principles of all the chemical tests listed to be performed to detect abnormal constituents of urine.

☐ Perform urine analysis to determine abnormal constituents like protein, reducing substance, ketone bodies, blood, bile salts, bile pigments by chemical tests according to the given procedure.

☐ Perform the dipstick analysis of given urine sample for chemical constituents according to the given procedure and observe the findings

BI11.5 Describe screening of urine for inborn errors & describe the use of paper chromatography

Enumerate the urine screening tests for inborn errors of metabolism.

Identify the urine screening tests for inborn errors of metabolism as positive or negative and interpret the findings.

☐ Describe the principle and uses of paper chromatography Interpret the given paper/TLC chromatogram of amino acids accurately.

☐ Interpret the given lab reports of screening tests for inborn errors of metabolism

BI11.6 Describe the principles of colorimetry

☐ Describe the principle of photoelectric colorimeter/spectrophotometer and the application of Beer Lambert's law

Describe the parts of the photoelectric colorimeter using a labeled Diagram Explain the differences between colorimeter and spectrophotometer

BI11.7 Demonstrate the estimation of serum Creatinine and Creatinine clearance

☐ Explain the principle of Jaffe's method and modified Jaffe's method for estimation of serum Creatinine

☐ Describe the principle of Jaffe's method for estimation of urine creatinine

- ☐ Perform the estimation of serum creatinine by Jaffe's method using a colorimeter as standard test protocol
- ☐ Perform the estimation of urine creatinine by Jaffe's method using colorimeter as per the standard test protocol.
- ☐ Calculate the creatinine clearance using the formula UV/P with given volume of urine output and the serum Creatinine and urine Creatinine determined in previous experiment.
- ☐ Interpret the given serum creatinine, urine creatinine and creatinine clearance values against biological reference intervals.
- ☐ Interpret the given serum creatinine, urine creatinine and creatinine clearance values in pathological conditions.

Explain the difference between measured and calculated eGFR and its clinical significance. Explain the use of urine Creatinine in expressing the excretion of other compounds as ratios.

BI11.8 Demonstrate estimation of serum proteins, albumin and A:G ratio

Describe the principle of Biuret method for estimation of serum Total protein

Describe the principle of Dye binding method (BCG) for estimation of serum Albumin Perform the estimation of serum Total protein by Biuret method using colorimeter as per the standard test protocol

- ☐ Perform the estimation of serum Albumin by Dye binding (BCG) method using colorimeter as per the standard test protocol
- ☐ Calculate A:G ratio using serum total protein and serum albumin values obtained in previous experiment
- ☐ Interpret the given serum protein, albumin and A:G ratio values against biological reference intervals

BI11.9 Demonstrate the estimation of serum total cholesterol and HDL- cholesterol

☐ Describe the principle of chemical/enzymatic method for estimation of serum Total Cholesterol

Describe the principle of given method for estimation of serum HDL Cholesterol Perform the estimation of serum Total cholesterol by chemical method using Colorimeter/Semi automated analyser as per the standard test protocol

- ☐ Perform the estimation of serum HDL cholesterol by chemical method using Colorimeter/Semi automated analyser as per the standard test protocol
- ☐ Interpret the given serum Total cholesterol and serum HDL Cholesterol values against biological reference intervals

BI11.10 Demonstrate the estimation of triglycerides

Describe the principle of given method for estimation of serum triglycerides

Perform ☐ the estimation of serum triglycerides by given method using Colorimeter/Semi automated analyser as per standard test protocol

- ☐ Interpret the given serum triglycerides values against biological reference

BI11.11 Demonstrate estimation of calcium and phosphorous

Describe the principle of OCPC/Dye binding method for estimation of serum Total calcium
Describe the principle of given method for estimation of serum phosphorous

Perform the estimation of serum Total calcium by given method using Semiautomated analyser as per standard test protocol

- ☐ Perform the estimation of serum phosphorous by chemical method using colorimeter as per the standard test protocol
- ☐ Interpret the given serum Total calcium and serum phosphorous values against biological reference intervals

BI11.12 Demonstrate the estimation of serum bilirubin

Describe the principle of given method for estimation of serum Total Bilirubin

Perform the estimation of serum Total bilirubin by given method using Colorimeter as per the standard test protocol

- ☐ Interpret the given serum Total bilirubin values against biological reference intervals

BI11.13 Demonstrate the estimation of SGOT/SGPT

Describe the principle of given method for estimation of serum SGOT
Describe the principle of given method for estimation of serum SGPT

Perform the estimation of serum SGOT by given method using Semi automated/autoanalyser as per the standard test protocol

- ☐ Perform the estimation of serum SGPT by given method using Semiautomated/autoanalyser as per the standard test protocol
- ☐ Interpret the given serum SGOT and serum SGPT values against biological reference intervals

BI11.14 Demonstrate the estimation of alkaline phosphatase

Describe the principle of given method for estimation of serum Alkaline phosphatase
Perform the estimation of serum Alkaline phosphatase by given method using Colorimeter/Semi automated analyser as per the standard test protocol

- ☐ Interpret the given serum alkaline phosphatase values against biological reference intervals

BI11.15 Describe & discuss the composition of CSF

Describe the normal physical properties of CSF

Describe the physical properties of CSF in abnormal conditions
Describe the normal chemical composition of CSF

Discuss the alterations in chemical composition of CSF in abnormal conditions

- ☐ Tabulate the physical and chemical lab CSF findings in different pathological

BI11.16 Observe use of commonly used equipments/techniques in biochemistry

- pH meter ,Paper chromatography of aminoacid ,Protein electrophoresis, TLC,PAGE, Electrolyte analysis by ISE,ABG analyzer, ELISA , Immunodiffusion , Autoanalyser, Quality control, DNA isolation from blood/tissue

Observe the estimation of pH of any two buffers using pH meter and their applications Observe the paper chromatography of aminoacids using standard amino acid mixtures and urine sample and their applications

☐ Observe the Thin layer chromatography of aminoacids using standard amino acid mixtures and urine sample and their applications

☐ Observe the agarose gel serum protein electrophoresis of normal and abnormal serum samples and their applications

☐ Observe the agarose gel hemoglobin electrophoresis of normal and abnormal blood samples and their applications

Observe the PAGE for separation of proteins and their applications Observe the

serum electrolyte analysis by ISE and their applications Observe the blood gas

analysis on ABG analyser and their applications

Observe the ELISA procedure with quantitation using plate reader and their applications

Observe the immunodiffusion technique and their applications

Observe the functioning of autoanalysers and describe the principles and advantages of autoanalysers in clinical biochemistry laboratory

Explain quality control process in clinical biochemistry laboratory and their use Observe the

isolation of DNA from blood/tissues and describe the application

BI11.17 Explain the basis and rationale of biochemical tests done in the following conditions:

☐ Diabetes Mellitus, Dyslipidemia, Myocardial infarction, Renal failure, gout, Proteinuria, Nephrotic syndrome, Edema, Jaundice, Liver diseases, pancreatitis, disorders of acid-base balance, Thyroid disorders.

List the lab tests used to diagnose diabetes mellitus List the tests

used to monitor diabetes mellitus status

Explain the basis and rationale of glycated haemoglobin to monitor diabetic status Explain the

basis and rationale of lipid profile in evaluation of cardiovascular risk assessment

Explain the basis and rationale of dyslipidemia in diabetes mellitus Enumerate the

tests used to evaluate cardiac function

Explain the basis and rationale of the tests used in diagnosis of Myocardial infarction

Explain the basis and rationale of the lab tests done to assess the functioning of kidney Discuss

the commonly done renal function tests in renal failure

Explain the basis and rationale of serum uric acid in gout

- ☐ Explain an algorithm for evaluation of

Explain the basis and rationale of tests used in diagnosis of Nephrotic syndrome Explain the lab evaluation for different types of Jaundice

Describe the lab tests done to assess the functioning of Liver Explain the basis and rationale of lab tests done in Liver disorders

Explain the basis and rationale of lab tests done to assess the functioning of pancreas Discuss the lab tests done in pancreatic disorders

Explain the basis and rationale of lab tests done to assess the functioning of thyroid Discuss the lab tests done in thyroid disorders

Discuss the lab tests done in acid base disorders Interpret the given lab report of patient with jaundice

Interpret the given lab report of patient with renal dysfunction Interpret the given lab report of pancreatic function tests Interpret the given lab report of thyroid function tests Interpret the given lab report of cardiac function tests

Interpret the given lab report of patient with type 2 diabetes mellitus

Interpret the given lab report of patient with acute chest pain presenting to emergency department

- ☐ Justify the given lab findings in patient presenting with arthritis

BI11.18 Discuss the principles of spectrophotometry.

Describe the principle of spectrophotometry Describe the parts of spectrophotometer

BI11.19 Outline the basic principles involved in the functioning of instruments commonly used in a biochemistry laboratory and their applications.

Describe the principle and uses of colorimeter Describe the principle and uses of spectrophotometer Describe the principle and uses of urinometer Describe the principle and uses of pH meter

Describe the principle and uses of semiautomated analyser

Describe the principle and uses of fully automated chemistry analyser Describe the principle and uses of fully automated immune-analyser Describe the principle and uses of centrifuge

Describe the principle and uses of electrophoresis apparatus Describe the principle and uses of glucometer

Describe the principle and uses of ABG analyser

Describe the principle and uses of electrolyte analyser by ISE

BI11.20 Identify abnormal constituents in urine, interpret the findings and correlate these with pathological states.

Identify the abnormal constituents of urine from the given chemical Tests

Interpret the abnormal physical and chemical test findings of the given urine sample

Correlate the abnormal urine findings in given urine sample with pathological states

BI11.21 Demonstrate estimation of glucose, creatinine, urea and total protein in serum.

Describe the principle of enzymatic method for estimation of serum glucose Perform the estimation of serum Glucose by enzymatic method using colorimeter Interpret the given serum glucose levels against biological reference intervals Describe the principle of Jaffe's method for estimation of serum creatinine Perform the estimation of serum creatinine by Jaffe's method using colorimeter Interpret the given serum creatinine levels against biological reference intervals Describe the principle of for estimation of serum urea by an end-point method Perform the estimation of serum urea by an end-point method using colorimeter Interpret the given serum glucose levels against biological reference intervals Describe the principle of Biuret method for estimation of serum total

BI11.20 Identify abnormal constituents in urine, interpret the findings and correlate these with pathological states.

Identify the abnormal constituents of urine from the given chemical tests.
Interpret the abnormal physical and chemical test findings of the given urine sample. Correlate the abnormal urine findings in given urine sample with pathological states

BI11.21 Demonstrate estimation of glucose, creatinine, urea and total protein in serum.

Describe the principle of enzymatic method for estimation of serum glucose Perform the estimation of serum Glucose by enzymatic method using colorimeter Interpret the given serum glucose levels against biological reference intervals Describe the principle of Jaffe's method for estimation of serum creatinine Perform the estimation of serum creatinine by Jaffe's method using colorimeter Interpret the given serum creatinine levels against biological reference intervals Describe the principle of for estimation of serum urea by an end-point method Perform the estimation of serum urea by an end-point method using colorimeter Interpret the given serum glucose levels against biological reference intervals Describe the principle of Biuret method for estimation of serum total protein Perform the estimation of serum Total protein by Biuret method using Colorimeter Interpret the given serum Total protein levels against biological reference intervals

BI11.22 Calculate albumin: globulin (AG) Ratio and Creatinine clearance

- ☐ Calculate A: G ratio using given serum total protein and serum albumin values and interpret the results.
- ☐ Calculate the creatinine clearance using the formula UV/P with given volume of urine output and interpret the results.

BI11.23 Calculate energy content of different food Items, identify food items with high and low glycemic index and explain the importance of these in the diet

□ Calculate the energy content of different food items correctly based on their carbohydrate, protein and lipid content

Identify food items with high and low glycemic index

□ Explain the importance of low and high glycemic index food items in diet in normal and diseased conditions

BI11.24 Enumerate advantages and/or disadvantages of use of unsaturated, saturated and trans fats in food.

Explain the advantages and/or disadvantages of use of unsaturated fats in food. Explain the advantages and/or disadvantages of use of saturated fats in food.

Explain the advantages and/or disadvantages of use of trans fats in food.

Summary of TL methods and list of competencies to be covered in Phase I MBBS

Sl.No	Topics and competency numbers	No. of. Hours	Department of Integration
1.	Introduction & Scope of Biochemistry	1 Lecture	
2.	Cell and organelles, Cell membrane, Transport across cell membranes (BI1.1)	2 Lecture + 2 Integration	Physiology
3.	Enzymes (BI2.1, BI2.3, BI2.4, BI2.5, BI2.6, BI2.7) General Enzymology-	5 lecture + 2 small group teaching + 2 Case based Learning	General Medicine & Pathology
4.	Chemistry of Carbohydrates (BI3.1)	3 lectures	
5.	Chemistry of lipids (BI4.1, BI11.24)	3 lectures	
6.	Chemistry of amino acids and Proteins (BI5.1, BI5.2)	3 lectures	
7.	Plasma proteins (BI5.2)	1 lecture + 2 Case Based Learning + 1 integrated teaching	Physiology, General Medicine & Pathology
8.	Immunology (BI10.3, BI10.4, BI10.5)	1 lecture + 2 integrated teaching	Physiology, Microbiology, Pathology, Paediatrics, General Medicine, OBG, General Surgery

9.	Vitamins (BI6.5)	2 lectures + 4 Small group teaching + 6 Case Based Learning	General Medicine
10.	Free Radicals and Antioxidants (BI7.6, BI7.7)	1 lectures + 2 Small group teaching	Pathology, General Medicine
11.	Heme metabolism (BI6.12, BI5.2)	1 lecture + Integrated teaching	Physiology, Pathology, General Medicine
12.	Heme metabolism (BI6.11, BI11.17)	2 lectures + 4 Case Based Learning + 1 integrated teaching	Physiology, Pathology, General Medicine
13.	Extracellular matrix (BI9.1, BI9.2)	2 lectures + 2 Small Group Teaching	
14.	Biological Oxidation (BI6.6)	3 lectures	
15.	Carbohydrate metabolism (BI3.2, BI3.3, BI3.4, BI3.5, BI3.6, BI3.7, BI3.9)	8 lectures + 2 Small group teaching + 4 Case Based Learning	General Medicine [all topics] Physiology[glycolysis & TCA], Pathology [lab tests])
16.	Lipid metabolism (BI4.2, BI4.3, BI4.4, BI4.6)	8 lectures + 2 Small group teaching + 2 Case Based Learning	
17.	Protein and amino acid metabolism (BI5.3, BI5.4, BI5.5, BI11.17)	7 lectures + 2 Small group teaching + 4 Case Based Learning	General Medicine & Paediatrics
18.	Metabolism and homeostasis (BI6.1, BI3.8, BI4.5, BI4.7, BI3.10, BI11.17)	2 lectures + 4 Small group teaching + 2 integrated teaching	General Medicine & Pathology
19.	Minerals (BI6.9, BI6.10)	2 lectures + 4 Small group teaching + 2 Case Based Learning + 2 integrated teaching	General Medicine & Physiology
20.	Chemistry of Nucleic acids (BI7.1)	2 lectures	
21.	Nucleotide metabolism (BI6.2, BI6.3, BI6.4)	2 lectures + 2 Case Based Learning	General Medicine, Physiology
22.	Molecular Biology (BI7.1, BI7.2, BI7.3, BI9.3) Case Based Learning- DNA Repair	7 lectures + 4 Small Group Teaching	Paediatrics
23.	Molecular biology techniques and Gene therapy	2 lectures + 2 Small	General

	(BI7.4) Core: Case Based Learning- Southern Blotting Technique	group teaching + 1 integrated teaching	Medicine & Paediatrics
24.	Biochemistry of Cancer (BI10.1, BI10.2) Case Based Learning- Prostate carcinoma, Breast carcinoma	3 lectures + 2 Case Based Learning + 2 integrated teaching	Pathology, General Surgery & OBG)
25.	Nutrition and dietetics (BI8.1, BI8.2, BI8.3, BI8.4, BI8.5, BI11.17, BI11.23, BI11.24)	3 lectures + 2 Small group teaching + 2 Case Based Learning + 2 integrated teaching	Pathology, Community Medicine General Medicine & Paediatrics
26.	Organ function tests (BI6.13, BI6.14, BI6.15, BI11.17)	1 lectures + 4 Small group teaching + 6 Case Based Learning + 2 integrated teaching	Anatomy, Physiology, Pathology, General Medicine
27.	Acid base balance (BI6.7, BI6.8, BI11.17)	2 lectures + 2 Case Based Learning + 1 integrated teaching	Physiology, Pathology, General Medicine
28.	Water and electrolyte balance (BI6.7)	1 lectures + 2 Small Group Teaching + 1 integrated teaching	Physiology, General Medicine
29.	Xenobiotics and Detoxification (BI7.5)	1 Lecture	
30.	Clinical chemistry (BI11.16)	2 Small Group Teaching	

Suggested format for monitoring academic performance and *providing feedback*

Sl. No.	Marks obtained		Feedback provided		Date	Signature of student	Signature of mentor
			Positive	Could be improved			
1.	Test 1						
2.	1st Internal Examination						
	Theory						
	Practical						
3.	Overall 1st quarter marks						
4.	Test 2						
5.	2nd Internal Examination						
	Theory						
	Practical						
6.	Overall 2nd quarter marks						
7.	Test 3						
8.	3rd Internal Examination						
	Theory						
	Practical						
9.	Overall 3rd quarter marks						

Suggested format for assessing Professionalism

Quarter	Overall attendance (5)	Timely submission of record books (5)	Takes the trouble to complete the record book well (5)	Behaves respectfully with peers and teachers (5)	Total (20)	Date	Signature of student	Signature Of mentor
1st								
2nd								
3rd								

Guidelines for scoring (to be shown to the student and discussed with them) Attendance – 95-100% - 5; 90-94% - 4; 85-89% - 3; 80-84% - 2

Timely submission of records – Always submits the record on time – 5; Often submits the record on time – 4; Sometimes submits the record on time – 3; Rarely submits the record on time – 2

Takes the trouble to complete the record well – Excellent: Presentation of content above expectations – 5; Good: Presentation of content meets expectations – 3; Needs Improvement: Presentation of content below expectations -1.
Content: Includes Tables, Charts, Diagrams, Calculations etc.

Behaves respectfully with peers and teachers – Always speaks politely and demonstrates the appropriate body language with peers and teachers – 5; Often speaks politely and demonstrates the appropriate body language with peers and teachers – 4; Sometimes speaks politely and demonstrates the appropriate body language with peers and teachers – 3; Rarely speaks politely and demonstrates the appropriate body language with peers and teachers – 2;

SEMINARS

Sl no	Date	Topic	Level of participation [attended/presented]	Remarks if any	Signature of faculty/mentor
1.					
2.					
3.					
4.					
5.					

Suggested format for participation in - Early Clinical Exposure

of the Facilitator:

ECE session No:

Area/Specialty visited:

Clinical Skills (Concepts learnt during ECE sessions):

Objectives

- 1.
- 2.
- 3.

Briefly describe what you learnt from this clinical visit in relation to the objectives. (in 100-150 words)

Apart from the above learning, what did you observe that influenced (Positive/negative) you? (in 100-150 words)

Signature of Facilitator

Suggested format for SELF DIRECTED LEARNING Topics

(Minimum one entry per term)

Name of the Facilitator:

SDL Topic:

SUMMARY OF CONCEPTS LEARNT (Concept map):

Signature of Facilitator

**Scoring pattern can be decided by individual colleges*

CERTIFICATION OF SKILL ACQUISITION IN BIOCHEMISTRY

SL. NO	COMPETENCY NO	TOPIC	CERTIFICATION DATE	SIGNATURE OF FACULTY
1.	BI11.4	Perform urine analysis to estimate and determine normal and abnormal Constituents		
2.	BI11.20	Identify abnormal constituents in urine, interpret the findings and correlate these with pathological states.		
3.	BI11.21	Demonstrate estimation of glucose		
4.	BI11.21	Demonstrate estimation of urea		
5.	BI11.7/ BI11.21	Demonstrate estimation of serum creatinine and creatinine clearance		
6.	BI11.8/BI11.21	Demonstrate estimation of serum total proteins, albumin& A:G ratio		

Certification of Competencies - Skill Acquisition

Suggested format for checklist *General Guidelines*

(All checklists for skill certification need not be essentially a part of log book. They should be used as a guide for evaluation)

Sl No	Assessment criteria	Date of each evaluation*		
	Overall performance (A/B/C)			
	Name of Evaluator			
	Signature of evaluator			

Competency Description:

*Number columns as per requirement

Each criteria may be assessed by different tools (OSPE/Practical/viva) using appropriate scoring pattern.

Marking of each assessment criteria ✓ if student meets the expectation for each criteria

X if student does not meet the expectation for each criteria

Overall Performance in these assessments can be graded as below:

☐ **Meets expectations (ME)**

A: Student is able to perform all the test and report the test results with appropriate interpretations independently and can be certified

☐ **Does not meet expectations (DME) -**

Student needs further training to perform and report the test results with appropriate interpretations independently and are evaluation to certify the same.

B: > than 50% of criteria meets expectation, reevaluation needed only for criteria which have not met the expectation.

C: < than 50% of criteria meets expectation, reevaluation needed for the entire competency

Feedback to students: After each assessment, the respective faculty to give the feedback to students regards the areas for improvement/reassessment

Description of competency: Perform urine analysis to estimate and determine normal constituents (BI 11.4)

SI No	Assessment criteria	Date of evaluation		
1	Student is able to list all physical characteristics of normal urine			
2	Student is able to perform the physical examination of urine sample for Volume, appearance, colour, odour, pH and specific gravity			
3	Student is able to interpret the results of all the above physical examination of urine sample			
4	Student is able to list common organic constituents (Urea, Uric acid, Creatinine, Urobilinogen) of normal urine and the tests to be performed			
5	Student is able to explain the principles of all organic tests performed for normal constituents of urine			
6	Student is able to perform relevant tests for organic constituents of urine according to the procedure given			
7	Student is able to interpret the results of all the tests for organic constituents of normal urine along with normal levels in urine			
8	Student is able to list common inorganic constituents (Calcium, Phosphate, Ammonia) of normal urine and the tests to be performed			
9	Student is able to explain the principles of all organic tests performed for normal constituents of urine			
10	Student is able to perform relevant tests for inorganic constituents of urine according to the procedure given			
11	Student is able to interpret the results of all the tests performed for inorganic constituents of normal urine along with normal levels in urine			
12	Student is able to interpret the physiological and pathological variations in organic and inorganic constituents of urine			
	Overall performance (A/B/C)			
	Appropriate feedback given to student (yes/No)			
	Name of Evaluator			
	Signature of evaluator			
	Signature of student			

It is hereby certified that the student is competent to perform the above mentioned skill
Date of certification:

Name and Signature of Evaluator:

Description of competency: Perform urine analysis to determine Abnormal constituents, interpret the findings and correlate with pathological states (BI 11.4 and BI 11.20)

Sl No	Assessment criteria	Date of evaluation		
1	Student is able to list the common abnormal constituents of urine (reducing substance, ketone bodies, proteins, blood, bile salts, bile pigments)			
2	Student is able to perform the physical examination of abnormal urine sample for Volume, appearance, colour, odour, pH and specific gravity			
3	Student is able to interpret the results of all the above physical examination of urine sample in different pathological conditions			
4	Student is able to list the relevant chemical tests to be performed to detect abnormal constituents of urine			
5	Student is able to explain the principles of all the chemical tests correctly			
6	Student is able to perform all the chemical tests correctly according to the procedure given			
7	Student is able to interpret the observations of all the tests as positive or negative correctly			
8	Student is able to explain the biochemical basis of combination of positive findings on physical examination and chemical analysis of given abnormal urine sample			
9	Student is able to interpret and associate various abnormal physical findings with different pathological conditions			
10	Student is able to interpret and associate various abnormal constituents with different pathological conditions			
	Overall performance (A/B/C)			
	Appropriate feedback given to student (yes/No)			
	Name of Evaluator			
	Signature of evaluator			
	Signature of student			

It is hereby certified that the student is competent to perform the above-mentioned

skillDate of certification:

Name and Signature of Evaluator:

Description of competency: Demonstrate estimation of Glucose in serum (BI 11.21)

Sl No	Assessment criteria	Date of evaluation		
1	Student is able to explain the Principle of the given method of estimation of Glucose			
2	Student is able to mention other methods for estimation with advantages and disadvantages			
3	Student is able to perform the estimation of Serum glucose in given sample according to the given procedure correctly			
4	Student is able to calculate the concentration of the given analyte using the appropriate formula.			
5	Student is able to write the report of the given test requested correctly with appropriate units and reference intervals			
6	Student is able to mention the preanalytical errors that could affect the test result			
7	Student is able to mention the right collection tube and right time for collecting fasting and post prandial samples			
8	Student is able to interpret the report of the given sample according to current standard guidelines using biological reference intervals of fasting, postprandial and random glucose.			
9	Student is able to relate the findings of estimation performed with clinical condition appropriately			
10	Student is able to extrapolate the results of serum glucose in different clinical conditions appropriately			
	Overall performance (A/B/C)			
	Appropriate feedback given to student (yes/No)			
	Name of Evaluator			
	Signature of evaluator			
	Signature of student			

It is hereby certified that the student is competent to perform the above-mentioned

skill Date of certification:

Name and Signature of Evaluator:

Description of competency: Demonstrate estimation of serum creatinine and creatinine clearance (BI 11.7, BI 11.21)

Sl No	Assessment criteria	Date of evaluation		
1	Student is able to explain the Principle of the given method of estimation of Serum Creatinine			
2	Student is able to mention other methods for estimation with advantages and disadvantages			
3	Student is able to perform the estimation of Serum Creatinine in given sample according to the given procedure correctly			
4	Student is able to calculate the concentration of the given analyte using the appropriate formula.			
5	Student is able to write the report of the given test requested correctly with appropriate units, reference intervals and interpret the result correctly.			
6	Student is able to mention the non-Creatinine interferences that could affect the test result			
7	Student is able to calculate Creatinine clearance using appropriate formula correctly and interpret the results			
8	Student is able to mention the indications for Creatinine clearance and its advantages.			
9	Student is able to calculate estimated Creatinine clearance using different formulae, different urine Creatinine ratios with their advantages.			
10	Student is able to explain the biochemical basis of altered levels of Creatinine in serum and urine in different pathological conditions			
	Overall performance (A/B/C)			
	Appropriate feedback given to student (yes/No)			
	Name of Evaluator			
	Signature of evaluator			
	Signature of student			

It is hereby certified that the student is competent to perform the above-mentioned

skill

Date of certification:

Name and Signature of Evaluator:

Description of competency: Demonstrate estimation of urea in serum (BI 11.21)

SI No	Assessment criteria	Date of evaluation		
1	Student is able to explain the Principle of the given method of estimation of Serum Urea			
2	Student is able to mention other methods for estimation with advantages and disadvantages			
3	Student is able to perform the estimation of Serum Urea in given sample according to the given procedure correctly			
4	Student is able to calculate the concentration of the given analyte using the appropriate formula.			
5	Student is able to write the report of the given test requested correctly with appropriate units and reference intervals			
6	Student is able to mention the preanalytical errors/ interferences that could affect the test result			
7	Student is able to calculate Blood urea nitrogen and explain its importance			
8	Student is able to enumerate various pre renal, renal and post renal causes for Uremia			
9	Student is able to relate the findings of estimation performed with clinical condition appropriately			
10	Student is able to extrapolate the results of serum urea in different clinical conditions appropriately			
	Overall performance (A/B/C)			
	Appropriate feedback given to student (yes/No)			
	Name of Evaluator			
	Signature of evaluator			
	Signature of student			

It is hereby certified that the student is competent to perform the above mentioned

skill
Date of certification:

Name and Signature of Evaluator:

Description of competency: Demonstrate estimation of serum protein , albumin and A:G ratio(BI 11.8, BI 11.21)

SI No	Assessment criteria	Date of evaluation		
1	Student is able to explain the Principle of the given method of estimation of Serum Total Protein and Serum Albumin			
2	Student is able to perform the estimation of Serum Total Protein and Serum Albumin in given sample according to the given procedure correctly			
3	Student is able to calculate the concentration of the given analyte using the appropriate formula.			
4	Student is able to calculate Total globulin level and A:G ratio correctly			
5	Student is able to write the report of the given test requested correctly with appropriate units and reference intervals			
6	Student is able to enumerate and explain the causes for Hypoproteinemia/ Hypoalbuminemia correctly			
7	Student is able to enumerate and explain the causes of Hyperproteinemia correctly			
8	Student is able to enumerate and explain the causes of reversed A:G ratio correctly			
9	Student is able to relate the findings of estimation performed with clinical condition appropriately			
10	Student is able to extrapolate the results of serum total protein and serum albumin in different clinical conditions appropriately			
	Overall performance (A/B/C)			
	Appropriate feedback given to student (yes/No)			
	Name of Evaluator			
	Signature of evaluator			
	Signature of student			

It is hereby certified that the student is competent to perform the above mentioned skill
Date of certification:

Name and Signature of Evaluator:

SCHEME OF EXAMINATIONINTERNAL

ASSESSMENT:

General guidelines

Regular periodic examinations shall be conducted throughout the course. There shall be **minimum three internal assessment examinations** in each preclinical subject. In addition, there shall be **one Internal Assessment in Community Medicine in Phase I MBBS**.

The **third internal examination** should be conducted on the lines of the university examination.

There shall be one short essay on ECE in each internal assessment in each subject.

There should be **at least one short question from AETCOM** in each subject in any of the internal assessment.

Questions on ECE and AETCOM in Internal Assessments must be assessed by the faculty of the respective pre-clinical departments (Anatomy/Physiology/Biochemistry)

An **average of the marks scored in the three internal assessment examinations** will be considered as the final internal assessment marks.

Learners **must secure not less than 40 % marks in theory and practical separately and not less than 50% marks of the total marks (combined in theory and practical)** assigned for internal assessment in a particular subject in order to be eligible for appearing at the final University examination of that subject.

A candidate who has not secured requisite aggregate in the internal assessment may be subjected to remedial measures by the institution. If he/she successfully completes the remediation measures, he/she is eligible to appear for University Examination. Remedial measures shall be completed before submitting the internal assessment marks online to the university.

Internal assessment marks will reflect under separate head in the marks card of the university examination. The internal assessment marks (theory/practical) will not be added to the marks secured (theory/practical) in the university examination for consideration of pass criteria.

The results of IA should be displayed on the notice board within a 1-2 week of the test.

Learners must have completed the required certifiable competencies for that phase of training and completed the logbook appropriate for that phase of training to be eligible for appearing at the final university examination of that subject.

Scheme for calculation of Internal (Formative) assessment marks:

Formative assessment :			
Theory	30 Marks	Practicals	30 Marks
Day to Day Assessments/MCQs/Viva tests	05	Practical records	05
Attitude/Communication skills	01 (being responsible enough to be present for all formative assessments T & P)	ECE Participation/Skill certification	05
Written Assignments	02		
Attendance	02 (for T + P attendance >90%) 01 (for T + P attendance between 80-90%)		
Total	40		40

Skill certification –

Grading-

A- 2 Marks

B- 1 Mark

C- Repeat till the student gets B or A.

Practical Records-05 marks

- Submission on time- 02 Marks if late submission is ≤ 2 times, 01 Mark if late submission > 2 times
- Completed records- 02 Marks if incomplete record is submitted ≤ 2 times, 01 Mark if incomplete record is submitted > 2 times
- Legibility and neatness- 01 Mark

Table: Type, number of questions and distribution of marks for written paper

TYPES OF QUESTION	NUMBER OF QUESTIONS	MARKS FOR EACH QUESTION
Long essay	2	10
Short essay	10	5
Short answers	10	3

1. ELIGIBILITY FOR EXAMINATION

The following criteria to be met by the students to be eligible for the university exams:

- Shall have undergone satisfactorily the approved course of study in the subject/subjects for the prescribed duration.
- Shall have attended not less than 75% of the total classes conducted in theory and not less than 80% of the total classes conducted in practical separately to become eligible to appear for examination in that subject/subjects.
- Minimum of 40% marks to be obtained **separately** in theory and practical to appear for University exam. At least 50% marks of the total marks **combined** in theory and practical assigned for internal assessment is to be obtained in a particular subject. (average of 3 internal assessments theory and practical separately)
- Learners must have completed the required certifiable competencies for that phase of training and completed the logbook appropriate for that phase of training to be eligible for appearing at the final university examination of that subject.

2. CRITERIA FOR PASS

For declaration of pass in any subject in the University examination, a candidate shall pass both in Theory and Practical examination components separately as stipulated below:

- The Theory component consists of marks obtained in University Written papers only. For a pass in theory, a candidate must secure at least 40% marks in each of the two papers with minimum 50% of marks in aggregate (both papers together).
- For a pass in practical examination, a candidate shall secure not less than 50% marks in aggregate, i.e., marks obtained in university practical examination and viva voce added together.
- Internal assessment marks will reflect as a separate head of passing at the university examination.**

A candidate not securing 50% marks in aggregate in Theory or Practical examination + viva in a subject shall be declared to have failed in that subject and is required to appear for both Theory and Practical again in the subsequent examination in that subject.

3. DECLARATION OF CLASS

- a. A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 75% of marks or more of **grand total marks (university examination + internal assessment)** prescribed will be declared to have passed the examination with distinction.
- b. A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 65% of marks or more but less than 75% of **grand total marks (university examination + internal assessment)** prescribed will be declared to have passed the examination in First Class.
- c. A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 50% of marks or more but less than 65% of **grand total marks (university examination + internal assessment)** prescribed will be declared to have passed the examination in Pass Class.
- d. A candidate passing a university examination in more than one attempt shall be placed in Pass class irrespective of the percentage of marks secured by him/her in the examination.

Note: Please note fraction of marks will not be rounded off for clauses (a), (b) and (c) UNIVERSITY EXAMINATIONS

[Kindly refer section II for general guidelines]

TABLE SHOWING SCHEME FOR CALCULATION OF UNIVERSITY EXAMINATION MARKS

Theory (maximum marks)		Practical (maximum marks)	
Paper 1	100	Practical exam (Practical Exercise 1 to 4)	80
Paper 2	100	Viva-voce	20
TOTAL	200	TOTAL	100

A. THEORY: 200 Marks

There shall be two theory papers of 100 marks each and duration of each paper shall be 3 hours. The pattern of questions in each paper shall be as mentioned below

Type of Question	Number of Questions	Maximum Marks for each question	Total
Structured Long essay questions (SLEQ) [Includes one case vignette-based question (CVBQ)]	2	10	20
Short ESSAY questions (SEQ) [includes two case vignette-based questions (CVBQ)]	10	05	50
Short answer questions (SAQ)	10	03	30
Total marks			100

PRACTICAL:

Practical exercises – 80 marks

- 1. Exercise 1: OSPE - 20 Marks**
- 2. Exercise 2: Qualitative analysis of Normal or Pathological constituents of Urine - 20 Marks**
- 3. Exercise 3: Quantitative estimation and interpretation - 20 Marks**
- 4. Exercise 4: Case studies - 20 Marks**

Exercise 1: OSPE (20 Marks)

No. of Stations: 4 (1 performance station, 3 response stations) Marks
for Each Station: 5
Time for each station: Max 5 min

Exercise 2: Qualitative analysis of Normal or Pathological constituents of Urine (20 Marks)

Selection, principle and performance of tests :10 marks
Interpretation and Discussion :10 marks

Note: Alphabetically arranged test procedures shall be given.

Exercise 3: Quantitative estimation and interpretation (20 Marks)

Principle: 5 Marks
Performance, Calculation and Results: 5 Marks
Interpretation and Discussion: 10 Marks

Note : Procedure sheets shall be given.

Exercise 4: Case studies (20marks)

Total No. of case reports: 2

1 Major Case study for 12 marks and 1 Minor Case study for 8 marks

Suggested Major Case studies: Organ function tests/Diabetes mellitus/Acid basedisorders/Myocardialinfarction/Dyslipidemia/PEM

Note : Questions for Quantitative experiments may preferably be case based scenarios.

B. Viva voce : 20 marks

The viva - voce examination shall carry 20 marks and all examiners will conduct the examination. Viva should focus on application and interpretation. (viva marks to be added to practical and not theory)

Distribution of topics for Paper 1 and Paper 2 for University examination Topic wise weightage

Sl No	Paper 1 Topics	Weight age Up to (in marks)	Long Essay	Short Essay	Short answer	MCQ
1	Cell, cellular organelles and membrane transport	5		√	√	√
2	Extra cellular matrix	3		√	√	√
3	Enzymes	13	√	√	√	√
4	Carbohydrate Chemistry	5		√	√	√
5	Carbohydrate Metabolism	13	√	√	√	√
6	Lipid Chemistry	5		√	√	√
7	Lipid Metabolism	13	√	√	√	√
8	Metabolism and homeostasis	8		√	√	√
9	Biological Oxidation	5		√	√	√
10	Vitamins	13	√	√	√	√
11	Minerals	13	√	√	√	√
12	Nutrition	10	√	√	√	√
13	Acid Base Balance	13	√	√	√	√

14	Water and Electrolyte Balance	6		√	√	√

Sl No	Paper 2 Topics	Weightage Upto (in marks)	Long Essay	Short Essay	Short answer	MCQ
1	Protein Chemistry	6		√	√	√
2	Plasma proteins	5		√	√	√
3	Immunology	5		√	√	√
4	Protein and amino acid Metabolism	13	√	√	√	√
5	Nucleic acid Chemistry	6		√	√	√
6	Nucleotide metabolism	10	√	√	√	√
7	Molecular Biology	13	√	√	√	√
8	Molecular Biology Techniques	13	√	√	√	√
9	Biochemistry of Cancer	10	√	√	√	√
10	Heme Metabolism	13	√	√	√	√
11	Organ function tests	13	√	√	√	√
12	Free radicals and Antioxidants	6		√	√	√
13	Xenobiotics and Detoxification	3		√	√	√
14	Clinical Chemistry	5		√	√	√

Note:

- Weightage of marks assigned to topics may add to more than 100
- Structured Long essay question should be from the topics with weightage of MORE THAN 10 marks. However, a part of structured long essay may be from other topics adhering to the weightage of marks allotted for that topic.
- **The topics to different paper are generally evaluated under those sections. However, a strict division of the subject may not be possible and some overlapping of topics is inevitable. Students should be prepared to answer overlapping topics.**

RECOMMENDED BOOKS

TEXT BOOKS: (Recent editions)

1. DM Vasudevan. Textbook of Biochemistry for Medical students
2. Lippincotts' Illustrated reviews – Biochemistry
3. S.K.Gupta. Biochemistry for MBBS
4. Pankaja Naik. Biochemistry
5. Dinesh Puri. Textbook of Medical Biochemistry
6. Namrata Chhabra. Case oriented approach towards Biochemistry
7. Divya shanti D'sza, Sowbhagyalakshmi. An easy guide to Practical Biochemistry.

REFERENCE BOOKS: (Recent editions)

1. Harpers' Illustrated Biochemistry
2. Marshall and Bangert. Clinical Chemistry
3. Baynes and Dominiczak. Medical Biochemistry
4. Lehninger Principles of Biochemistry 7th International Edition by David L Nelson, Macmillan
5. Kuby Immunology, sixth edition, by Thomas J. Kindt et al.
6. Bhagavan and Ha. Essentials of Medical Biochemistry with clinical cases
7. Stryer. Biochemistry
8. James Watson. Molecular biology of gene



Curriculum for Physiology 2022



**Ramaiah Medical College
Ramaiah University of Applied Sciences
Bengaluru-560054**

Introduction to the Department

Department of Physiology has state of the art facilities to impart quality medical education. Students are trained in basic principles, mechanism and homeostatic control of all the functions of human body as a whole. This includes teaching learning related to normal functions of all human organ systems, regulatory mechanisms and interactions of the various organs for well-coordinated total body function. Students understand the physiological aspects of normal growth and development and also learn to analyze physiological responses and adaptations to different stresses during life processes.

Teaching staff comprises of qualified and experienced Physiologists, training students to be adept with various Physiological concepts which will help the students in their professional career.

Department has well equipped human, clinical and hematology laboratories to demonstrate and acquire the skills to do the experiments for study of physiological functions and clinical examinations. There is a computer assisted lab for teaching animal experiments.

Department of Physiology conducts regular yoga sessions for physical and mental health of the students. Department also has research laboratory to analyze and interpret experimental and investigative data to update and to do advanced research in the field of Physiology.

COURSE OUTCOMES

At the end of the Physiology Course, students should be able to:

1. Explain the normal functioning of all organ systems and their interactions for maintenance of homeostasis.
2. Discuss the basic principles, mechanisms, pathophysiology of disease states and their management.
3. Acquire the skills to do experiments / clinical examinations for study of Physiological functions and interpret the report critically.
4. Communicate effectively and show respect towards the subject / peer during clinical examinations.

Goal:

The broad goal of the teaching of undergraduate students in Physiology aims at providing the student comprehensive knowledge of the normal functions of the organ systems of the body to facilitate an understanding of the physiological basis of health and disease.

Objectives:**a. Cognitive domain**

At the end of the course the student will be able to:

1. Explain the normal functioning of all the organ systems and their interactions for well-coordinated total body function.
2. Assess the relative contribution of each organ system to the maintenance of the milieu interior.
3. Elucidate the physiological aspects of normal growth and development.
4. Describe the physiological response and adaptations to environmental stresses.
5. List the physiological principles underlying pathogenesis and treatment of disease.

b. Psychomotor domain

At the end of the course the student will be able to:

1. Conduct experiments designed for study of physiological phenomena.
2. Interpret experimental/investigative data.
3. Conduct and interpret clinical examination in normal healthy subject.
4. Distinguish between normal abnormal data derived as a result of tests, which he/she has performed and observed in the laboratory.

c. Affective domain

At the end of the course the student will be able to:

1. Show due respect to persons who volunteer to be examined for the purpose of learning clinical examination.
2. Communicate effectively with peers, teachers and volunteer in clinical examination.
3. Demonstrate the ability of teamwork.

d. Integration

At the end of the integrated teaching the student should acquire an integrated knowledge of organ structure and function and the regulatory mechanisms.

Competencies in Physiology, MBBS Phase I

Sl. No.	Topic	Number of Competencies
1.	General Physiology	9
2.	Haematology	13
3.	Nerve & Muscle Physiology	18
4.	Gastro intestinal Physiology	10
5.	Cardiovascular Physiology	16
6.	Respiratory Physiology	10
7.	Renal Physiology	9
8.	Endocrine Physiology	6
9.	Reproductive Physiology	12
10.	Neurophysiology	20
11.	Integrated Physiology	14
	Total	137

Minimum Teaching Hours and Methods

Cognitive and Psychomotor domain:

Physiology	Lectures	Small group learning / Tutorial / Integrated learning / Practical	Self - Directed Learning	Early Clinical exposure (Basic science correlation & Clinical skills)	Total
Number of hours	160	310	25	30 (18+12)	525

Affective domain:

AETCOM	Topic	Hours
1	What does it mean to be a patient?	15 (8+7)
2	The doctor-patient relationship	

List of Competencies

Topic: General Physiology – 8 hrs	
Number	Competency
PY 1.1	Describe the structure and function of a mammalian cell - Describe the structure of “Fluid-Mosaic” model of cell membrane - List the functions of the components of the cell membrane - List the cell organelles and describe their functions - List the components of cytoskeleton (microfilaments, microtubules, molecular motors) and explain their function in intra cellular transport
PY 1.2	Describe and discuss the principles of homeostasis Describe the concept of Milieu interior

	• Discuss the regulatory systems that maintain homeostasis • Describe positive and negative feedback mechanisms with appropriate examples
PY 1.3	Describe intercellular communications • List the types of Intercellular junctions and describe their functions • Describe the various functional types of intercellular signaling (autocrine, paracrine, synapse, neuroendocrine and endocrine)
PY 1.4	Describe Apoptosis- Programmed cell death. • Define apoptosis • Describe the function of apoptosis • Briefly describe the pathways involved in apoptosis
PY 1.5	Describe and discuss transport mechanism across cell membrane • List the types of transports across cell membrane (passive, active, vesicular) • Distinguish between active and passive transport mechanisms • Define simple diffusion and explain the factors affecting simple diffusion • Explain facilitated diffusion with examples. • List the differences between simple and facilitated diffusion • Define osmosis, osmotic pressure, tonicity of plasma. • Explain Primary active transport with examples. • Explain Secondary active transport with examples • Explain Vesicular transport: Endocytosis, exocytosis with physiological examples
PY 1.6	Describe the fluid compartments of the body, its ionic composition & measurements. • List the Units of measuring tonicity: moles and equivalents • Explain the physiological importance of maintaining plasma tonicity • Explain the difference between Osmolarity and osmolality • Provide the normal value of total body water in normal healthy adult and list the factors which contribute to its variation. • Describe the distribution of total body water in different body fluid compartments. • List the difference in ionic composition of ECF and ICF and its importance in physiological functions • Explain the methods to assess body fluid compartments and list the specific indicators used for each compartment. • Explain the physiological basis of fluid replacement in dehydration / overhydration
PY 1.7	Describe the concept of pH & buffer systems in the body • Describe the concept of pH and state the normal pH of arterial blood. • Define a buffer • List the buffer systems in the body • Define acidosis and alkalosis.

PY1.8	Describe & discuss the molecular basis of resting membrane potential and action potential in the excitable tissue. • Define ‘stimulus’ and ‘excitability’ • Classify stimulus based on a) strength and b) modality • Define resting membrane potential and indicate its normal value (range) • Define the Nernst Potential of an ion • Describe the ionic basis of the resting membrane potential and the application of the Goldman-Hodgkin-Katz equation • Define Gibbs-Donnan effect and indicate its role in the genesis of the resting membrane potential • Define action potential. Draw and label an action potential • Describe the ionic basis of the action potential • List blockers of voltage gated channels that participate in the action potential • Distinguish between a local response (Graded Potential) and an action potential
PY 1.9	Demonstrate the ability to describe and discuss the methods used to demonstrate the functions of the cells and its products, its communications and their applications in clinical care and research • Describe the methods to assess cellular physiology with respect to the following: ○ Cellular functions: ▪ Patch clamp technique ▪ microscopy – secretory/ active/ non-secretory cells ○ Cellular products and communication: immunohistochemistry, estimation of secretory products ○ Cell culture
Topic: Blood – 16 hrs	
Number	Competency
PY2.1	Compositions and functions of blood • List the components of blood (cellular and noncellular) • and describe the functions. • State the normal packed cell volume (hematocrit) and describe its use in clinical medicine
PY2.2	Origin, forms, variations and functions of plasma • List the plasma proteins and give normal values and the A/G ratio • Describe the physiological role of the plasma proteins • Describe the role of plasma proteins in Starling's forces and in the pathophysiology of edema • Discuss the alterations in plasma protein levels in health and disease

PY2.3	Synthesis and functions of hemoglobin and its breakdown. Variants of hemoglobin • Explain structure of normal hemoglobin. • State the normal Hb range for males and females and explain the basis for the differences • List the types of Hemoglobin (normal and abnormal) • Explain the fate (breakdown) of hemoglobin • Discuss the variants of hemoglobin
PY2.4	RBC formation (erythropoiesis and its regulation) and its functions • Define hemopoiesis. • Define erythropoiesis. • Describe the morphology of RBC • State the normal life span of the RBC • Describe the clinical importance of determining PCV and ESR • List the sites of erythropoiesis in fetus and adult. • Describe the stages of erythropoiesis and its regulation. • Describe the morphology, normal count and clinical significance of reticulocytes
PY2.5	Different types of anemia and jaundice. • Define anemia and classify based on i) Morphology ii) Etiology • Explain the physiological basis of symptoms/signs of anemia • Describe the causes and physiological basis of treatment of iron deficiency anemia • Describe the cause and treatment of megaloblastic anemia • List the types of polycythemia and discuss its consequences • List the RBC indices and describe the variations in disease • Define and classify jaundice. • Differentiate the different types of jaundice. • Describe Physiological jaundice
PY2.6	WBC formation (granulopoiesis) and its regulation. • Classify WBCs and state their normal counts and variations from normal counts • Describe the normal morphology and functions of each WBC • Describe the stages and factors required for leucopoiesis • Describe the stages of phagocytosis • Enumerate the classical signs of inflammation
PY 2.7	Formation of platelets, functions and variations. • Describe the morphology of the platelets • Discuss the normal count of platelets and its variations • Describe thrombopoiesis and factors regulating it • Explain the functional role of platelets

PY 2.8	Physiological basis of hemostasis and anticoagulants. Bleeding and clotting disorders (hemophilia, purpura) • Define hemostasis, and describe the sequence of events of hemostasis • List out the difference between temporary hemostatic plug and a clot • Enumerate the important clotting factors and their sites of production • Explain the mechanism of clotting via: a) Intrinsic and b) extrinsic pathways. • Describe the role of Vitamin K and calcium in coagulation • Explain the process of clot retraction • Lists the tests for hemostasis • Differentiate between Coagulation and Bleeding disorders • Explain the symptoms and the mode of inheritance of hemophilia • Describe the steps of fibrinolysis • List anticoagulants and their mechanism of action • Discuss the physiological basis of the treatment of DIC and thrombosis.
PY2.9	Different Blood groups and clinical importance of blood grouping, blood banking and transfusion. • List the blood group systems. Describe the ABO system, Rh system State the Landsteiner's Law • Describe the mode of inheritance of blood groups • Discuss the importance of blood groups • Discuss the importance and the methods of cross matching: direct and indirect • List the physiological basis of the symptoms and treatment of Rh incompatibility (erythroblastosis fetalis) • List the hazards of blood transfusion • Describe the complications of mismatched blood transfusion • Describe how blood is stored and discuss the changes that occur in stored blood
PY2.10	Different types of immunity. Development of immunity and its regulation. Lymph-composition, circulation and functions • Define and classify immunity (Innate/ acquired; specific and non-specific; active / passive) with examples • List the cells and the organs which are responsible for immunity • Draw a diagram explaining the structure of an antibody • Discuss antigen presentation • Explain the mechanism of humoral immunity in relation to cells involved, type of antibodies and the role in immunity • Explain the mechanism of cell mediated immunity in relation to cells involved, roles of each cell • Describe the role of cytokines in immunity • Compare the primary and secondary responses in immunity

	Describe the basis of a) hypersensitivity reactions b) autoimmunity c) graft vs host reaction d) immune tolerance
PY2.11	Hb, RBC, TLC,RBC indices, DLC, blood groups, BT/ CT Perform Hb, RBC, TLC,RBC indices, DLC, blood groups, BT/ CT
PY2.12	ESR, Osmotic fragility, Hematocrit. Observe ESR, Osmotic fragility, Hematocrit
PY2.13	Steps for reticulocyte and platelet count. Observe Steps for reticulocyte and platelet count.
Topic: Nerve and Muscle Physiology – 10 hrs	
Number	Competency
PY 3.1	Describe the structure and functions of a neuron and neuroglia; Discuss Nerve Growth Factor & other growth factors/cytokines - Describe the structure and functions of a neuron - List the different types of neuroglia and list their functions - Discuss the actions of Nerve Growth Factor & other growth factors
PY 3.2	Describe the types, functions & properties of nerve fibers - Define absolute and relative refractory period - Discuss the implications of the absolute and relative refractory period - Define All or None Law - Distinguish between temporal and spatial summation - Explain with the help of a diagram, the concept of ‘local currents’ in a nerve - Distinguish between orthodromic and antidromic nerve conduction - List the factors which affect conduction velocity in a nerve and indicate whether they increase or decrease conduction - Explain the basis of how myelination and diameter affect nerve conduction - Classify nerve fibres.
PY 3.3	Describe the degeneration and regeneration in peripheral nerves - Classify nerve injuries - Describe the features of Wallerian degeneration with the help of a diagram - List some common causes of neuropathy - List the factors affecting nerve regeneration

PY 3.4	Describe the structure of neuro-muscular junction and transmission of impulses • Describe structure of the neuromuscular junction • List in sequence the events that occur at the neuromuscular junction • Distinguish between the end plate potential and an action potential
PY 3.5	Discuss the action of neuro-muscular blocking agents • Identify, with examples potential sites where neuromuscular transmission can be affected (pre-synaptic, synaptic and post-synaptic) • Explain the mechanism of action of the drugs acting at the neuromuscular junction.
PY 3.6	Describe the pathophysiology of Myasthenia gravis • Describe the physiological basis of the cause and clinical features of myasthenia gravis • List the principles of treatment. • Distinguish between myasthenia gravis and Eaton Lambert syndrome
PY 3.7	Describe the different types of muscle fibres and their structure • Compare and contrast the structure and functions of skeletal, cardiac and smooth muscle. • Distinguish between fast and slow muscle fibres • List the phenomena associated with increasing frequency of stimulation (Beneficial effect, Treppe, Clonus, Tetanus) and explain the basis of the phenomena • Draw a diagram depicting the length-tension relationship (Starling's Law) and explain its basis • Draw a diagram depicting the load-velocity relationship and explain the phenomena • Define muscle fatigue and explain the mechanisms for it • Explain the basis for the phenomenon of Quantal summation
PY 3.8	Describe action potential and its properties in different muscle types (skeletal & smooth) • Describe action potential, its ionic basis and its properties in skeletal muscle • Describe action potential, its ionic basis and its properties in smooth muscle and compare it with the action potential seen in skeletal muscle
PY 3.9	Describe the molecular basis of muscle contraction in skeletal and in smooth muscles • Draw and label the sarco-tubular system of the skeletal muscle • List the steps involved in excitation-contraction coupling

	• Describe a sarcomere • List the molecular events associated with contraction and relaxation of skeletal muscle • Explain the phenomenon of a) rigor mortis b) heat rigor • List the processes of heat formation in the muscle • Describe the structure of smooth muscle • Describe the types of smooth muscles with their features • Describe the following properties of smooth muscle: ○ Single muscle twitch ○ Latch bridge mechanism ○ plasticity • Explain the molecular basis of smooth muscle contraction
PY 3.10	Describe the mode of muscle contraction (isometric and isotonic) • Distinguish between isometric and isotonic muscle contraction • List examples of isometric and isotonic muscle contraction
PY 3.11	Explain energy source and muscle metabolism • Describe the sources of energy for skeletal muscle • Describe the phenomenon of oxygen debt in skeletal muscle and explain its basis • Distinguish between muscle hypertrophy and muscle hyperplasia • List different ways in which performance enhancing drugs act on skeletal muscle
PY 3.12	Explain the gradation of muscular activity • Discuss the methods used to grade exercise (extent of exertion: Borg exertion scale, Metabolic equivalents, percentage of maximal heart rate) / Vo₂ max.
PY 3.13	Describe muscular dystrophy: myopathies ☐ Briefly describe how muscle strength and muscle mass is assessed ☐ Briefly describe what the muscular dystrophies are ☐ List the common causes of myopathies
PY 3.14	Perform Ergograph • Perform ergography
PY 3.15	Demonstrate effect of mild, moderate and severe exercise and record changes in cardiorespiratory parameters • Demonstrate the effect of mild, moderate and severe exercise and record changes in cardiorespiratory parameters (Pulse and BP).
PY 3.16	Demonstrate Harvard Step test and describe the impact on induced physiologic parameters in a simulated environment • Perform Harvard step test

PY 3.17	Describe Strength-duration curve □ Draw, label and explain the strength duration curve (SDC) □ List the changes that are seen in the SDC during nerve injury and in response to treatment
PY 3.18	Observe with Computer assisted learning (i) amphibian nerve - muscle experiments (ii) amphibian cardiac experiments • Observe (i) amphibian nerve - muscle experiments (ii) amphibian cardiac experiments through computer assisted learning
Topic: Gastrointestinal physiology – 10 hrs	
Number	Competency
PY 4.1	Structure and functions of digestive system • Describe the general organization of Gastrointestinal System • Illustrate a typical section of the GI wall. • List the functions of digestive system • Describe the intrinsic and extrinsic innervations of GIT and their function. Add a note on the action of Acetylcholine and epinephrine.
PY 4.2	Describe the composition, mechanism of secretion , functions and regulation of saliva gastric, pancreatic intestinal juices and bile secretion • Classify salivary glands. • Describe the composition of salivary secretion and explain its functions • Describe the mechanism of salivary secretion and its regulation • Explain the functional anatomy and histology of stomach • Describe the composition of gastric secretion and explain its functions. Explain in detail the mechanism of HCl secretion. • Enumerate the phases of Gastric secretion and describe their regulation. • Describe the experimental evidences to demonstrate the regulation of Gastric acid secretion. • Explain the effects of total gastrectomy • Explain the functional anatomy of the exocrine part of pancreas • Describe the composition of pancreatic secretion and explain its functions • Describe the mechanism of secretion and regulation of pancreatic juice. • Describe the functional anatomy and histology of the small intestine • Describe the composition and functions of succus entericus • Describe the pathophysiological basis of malabsorption syndrome • Describe the structural characteristics of the large intestine. • List the functions of the large intestine
PY 4.3	Describe GI movements , regulation and functions , describe defecation reflex, explain role of dietary fibre • Describe the events in the various phases of Deglutition • Discuss Basal Electrical rhythm and its ionic basis

	• Describe Gastric emptying and the various factors influencing it • Discuss the features and function of the Migrating Motor Complex • Define the law of Gut. Discuss different types of movements of the small intestine • Describe the movements of the large intestine. Add a note on Gastrocolic reflex. • Describe the defecation reflex. • Explain the formation and composition of faeces • Discuss the physiological role of dietary fibres • Describe the nervous and hormonal regulation of GI motility
PY 4.4	Describe the physiology of Digestion and absorption of nutrients • Describe the sites and mechanism of digestion and absorption of Carbohydrates. Add a note on Lactose intolerance. • Describe the sites and mechanism of digestion and absorption of Proteins. • Describe the sites and mechanism of digestion and absorption of Fats. Add a note on Steatorrhea • Describe the sites and mechanism of absorption of water • Discuss the mechanism of absorption of vitamins, and minerals from the GIT into blood stream. • Describe the pathophysiological basis of malabsorption syndrome
PY 4.5	Describe the source of GIT hormones, their regulations and functions • List the GI hormones and their sites of production • Describe the actions and regulation of the GI hormones.
PY 4.6	Describe the gut brain axis • Describe the effect of Hypothalamic-Pituitary axis on GI function • Describe the role of Autonomic nervous system on regulation of GI functions • Discuss the role of gut microbiota and its influence on brain functions. Describe the effects of loss of Gut microbiota and its management (role of drugs, probiotics etc) • Describe action of GI hormones/ peptides on the CNS
PY 4.7	Describe and discuss the structure and functions of Liver and gall bladder. • Describe the functional anatomy of hepatobiliary system. • Describe the enterohepatic circulation • Discuss the functions of liver • Describe the mechanism of secretion and regulation of bile secretion. • Discuss the composition and functions of bile secretion. Distinguish between hepatic and gall bladder bile

	• Discuss the functions of gall bladder. Add a note on the effects of cholecystectomy
PY 4.8	Describe and discuss Gastric function tests, pancreatic Exocrine function tests and liver function tests • Enumerate Gastric function tests with clinical significance of each • Enumerate Liver function tests with clinical significance of each • Enumerate the Pancreatic function tests for exocrine part of Pancreas with clinical significance of each
PY 4.9	Discuss the physiology aspects of Peptic ulcers, Gastroesophageal reflux disease, vomiting, diarrhoea, constipation, Adynamic ileus , Hirschsprung's disease • Discuss dysphagia and its causes. • Discuss the pathophysiology and effects of achalasia cardia • Describe the cause and features of ○ GERD ○ Hiatus hernia • Describe the pathophysiology, symptoms and management of peptic ulcer • Discuss the pathophysiology, presentation and management of acute and chronic pancreatitis • Discuss the pathophysiology of ○ Vomiting ○ Diarrhoea ○ Constipation ○ Discuss the pathophysiology and presentation of Hirschsprung's disease, adynamic ileus
PY 4.10	Demonstrate the correct clinical examination of the Abdomen in a normal volunteer or simulated environment • Perform clinical examination of abdomen
Topic: Cardiovascular Physiology – 25 hrs	
Number	Competency
PY 5.1	Describe the functional anatomy of heart including chambers and pacemaker tissue and conducting system • Describe the functional anatomy of the heart and blood vessels ○ Differences between left and right side of the heart, ○ Describe the components of conducting system (with speed of conduction for each) ○ Types of blood vessels and their function • Differentiate between systemic & pulmonary circulations.

PY 5.2	Describe the Properties of cardiac muscle including its morphology, electrical , mechanical and metabolic functions. Describe the functional features of cardiac muscle in relation to: a) excitability b) conductivity c) autorhythmicity d)contractility e) non-fatigability f) all or none law g) refractory period h) extrasystole and compensatory pause i) staircase phenomenon j) Frank Starling Law
PY 5.3	Discuss the events occurring during the cardiac cycle - Define cardiac cycle, list the phases & its durations. - Describe with illustration, the electrical and mechanical events during a single cardiac cycle (Wigger's diagram) - Explain the Right atrial pressure changes during cardiac cycle with a JVP tracing. - Mention the clinical significance of JVP. - List the different heart sounds & explain their basis
PY 5.4	Describe generation, conduction of cardiac impulse. - Explain with a graph, the ionic basis of pacemaker potential. - Explain the effects of sympathetic & parasympathetic stimulation on pacemaker potential. - Explain with a graph, the ionic basis of cardiac ventricular muscle AP. - Describe functional significance of long refractory period in cardiac muscle. - Describe with a diagram the pathway of sequential electrical excitation of the heart. - Explain the basis & importance of A-V nodal delay in impulse conduction. - Explain the basis of SAN acting as the primary pacemaker. - Define an Ectopic pacemaker
P Y 5.5	Describe the physiology of electrocardiogram(ECG) its application and the cardiac axis - Define Electrocardiogram & list its uses. - Explain the principle behind recording an ECG in relation to: The cardiac dipole, Einthoven's triangle and Einthoven's Law - Classify the leads in a 12 lead ECG and explain the procedure of recording a conventional 12 lead ECG. - Draw and label a normal Lead II ECG waveform. Define normal durations of segments and intervals of normal ECG waves - Define the term Cardiac vector. Give the normal range of the mean cardiac vector & its significance. - Determine the cardiac axis from a normal ECG. Define axis deviation & mention the causes for the same.

PY 5.6	Describe abnormal ECG, Arrhythmias, heart block and myocardial infarction • Classify and describe arrhythmias based on its origin. • Define sinus arrhythmia & explain its basis. • Explain the different types of heart block • Describe ECG changes in fibrillation and flutter • Describe the ECG changes in Acute Myocardial Infarction & its basis. • Describe the ECG changes in left and right ventricular hypertrophy • Mention the salient ECG changes secondary to electrolyte disturbances
PY 5.7	Describe and discuss Haemodynamics of circulatory system • Describe the functional classification of blood vessels • Explain the hemodynamic principles governing blood flow through vessels (Poiseuille's law). • Differentiate between laminar & turbulent flow & factors determining the same (Reynold's number). • Describe the applications of the following: ○ Laplace law ○ Bernoulli's principle ○ Fahraeus Lindqvist effect
PY 5.8	Describe and discuss local and systemic cardiovascular regulatory mechanisms • Describe the regulation of local and systemic cardiovascular mechanisms
PY 5.9	Describe the factors affecting heart rate, regulation of cardiac output and blood pressure. • Mention the normal heart rate (range) & its variations. • List & explain the neural and hormonal mechanisms controlling heart rate. • Define arterial pulse. • Draw and label an arterial pressure pulse tracing • Define the terms- Cardiac output, Cardiac index, Stroke volume, Venous return; state their normal values • List & explain the factors determining cardiac output. • Explain the heterometric and homomeric regulation of cardiac output • List the methods of measuring cardiac output & explain their principles. • Mention the factors affecting venous return. • Define the terms & give their normal values: Blood pressure, Systolic blood pressure, Diastolic blood pressure, Pulsepressure & Mean arterial pressure • Describe the factors determining systolic & diastolic pressures. • List the various short-term mechanisms regulating blood pressure. • Describe the role of baroreceptor reflex mechanism in short term regulation of BP. • State & explain Marey's law.

	• Describe the role of CNS ischemic response & Cushing's reflex in the regulation of BP. • Explain the basis of postural hypotension • Describe the regulation of cardiovascular activity by the vasomotor center & higher brain areas. • Describe the role of long-term regulation of BP. • Describe the role of Renin-Angiotensin-Aldosterone mechanism in long term increase in BP. • List the various intermediate mechanisms for BP regulation. • Explain the operational principles of: Stress-relaxation mechanism, Capillary fluid shift mechanism & Renin-Angiotensin mechanism in intermediate term regulation of BP. • Define the terms – Hypertension, Hypotension
PY 5.10	Describe and discuss Regional circulation including microcirculation, Coronary circulation, Cerebral, Capillary, Cutaneous, Lymphatic, Foetal, Pulmonary and splanchnic circulation • Define microcirculation & describe with a diagram the structure of microcirculation. • List the functions of capillary circulation. • Describe the pattern & regulation of blood flow through capillaries. • List the factors governing movement of substances across the capillary wall. • Explain the Starling's forces determining Net filtration pressure for fluid movement across the capillary wall • Define edema & describe the basis of edema formation. • Describe the composition, formation & functions of lymph. • Explain the factors regulating lymph flow along the lymphatics. • Describe the organization & functions of venous system. • Define central venous pressure & give its normal value. • Describe the factors determining peripheral venous pressure & flow of blood through it. • Describe the method of measuring central venous pressure • Explain the intrinsic methods for acute auto regulation of blood flow. (myogenic, metabolic, perfusion theories) • Explain the mechanisms involved in long term local blood flow regulation. • List the humoral vasoconstrictor & vasodilator agents regulating local blood flow. • Mention the salient features of coronary circulation • Explain the regulation of coronary blood flow • Mention the causes & effects of coronary insufficiency • Describe the clinical features of Ischemic heart disease with its basis

	• Mention the salient features of cerebral circulation • Explain the regulation of cerebral blood flow • Define cerebral stroke & mention the causes for the same • List the salient features of splanchnic circulation • Define 'triple response' & explain the basis for the same • Mention the circulatory readjustments which occur at birth
PY 5.11	Describe the pathophysiology Shock , syncope and Heart failure • Define shock, mention the types & causes for each • Describe the stages of shock • Explain the principle in the management of shock • Discuss the physiological basis of vasovagal syncope • Define heart failure
PY 5.12	Record blood pressure and pulse at rest and in different grades of exercise and posture in a volunteer or simulated environment. • Perform recording of blood pressure and pulse at rest and in different grades of exercise and posture in a volunteer or simulated environment
PY 5.13	Record and interpret normal ECG in a volunteer or simulated environment • Record and interpret a normal ECG
PY 5.14	Observe cardiovascular autonomic function tests in a volunteer or simulated environment. • Observe cardiovascular autonomic function tests
PY 5.15	Demonstrate the correct clinical examination of the cardiovascular system in a normal volunteer or simulated environment. • Perform clinical examination of cardiovascular system
PY 5.16	Record arterial pulse tracing using finger plethysmography in a volunteer or simulated environment • Observe arterial pulse tracing using finger plethysmography
Topic: Respiratory Physiology – 12 hrs	
Number	Competency
PY 6.1	Describe the functional anatomy of respiratory tract • List the structures of the respiratory system with their functions. • Describe the structural divisions of airways with their function. • Draw the layers of respiratory membrane • List the respiratory & non-respiratory functions of respiratory system • Describe the special features of pulmonary circulation
PY6.2	Describe the mechanics of normal respiration, pressure changes during ventilation, lung volume and capacities, alveolar surface tension, compliance, airway resistance, ventilation, V/P ratio, diffusion capacity of lungs • List the primary & accessory muscles of inspiration & expiration

	• Describe the mechanism of inspiration and expiration • Define the physical laws applicable in respiratory physiology • Describe the genesis of negative intrapleural pressure • Draw a diagram to show the changes in air flow, intrapleural pressure and intra alveolar pressure during a breathing cycle • Define pulmonary compliance and list the factors altering the compliance • Distinguish between static and dynamic compliance. • Draw the lung compliance curve & explain the basis for its pattern • Describe the synthesis, composition & functions of pulmonary surfactant. Add a note on Respiratory distress syndrome • Define closing volume, list the factors determining closing volume & mention its significance • Define dead space with normal value, list its types and list the methods of determining dead space volume • Explain the effect of shunt on physiological dead space • Explain with illustration the relationship between alveolar ventilation & oxygen / carbon-di-oxide partial pressures in the alveolus • Define Alveolar Ventilation-Perfusion ratio & mention its regional differences and explain its physiological basis • Define Fick's law of diffusion and explain the factors affecting diffusion of gases across the respiratory membrane
PY6.3	Describe and discuss the transport of respiratory gases: Oxygen and Carbon dioxide • List the methods of transport of oxygen in blood. • Describe with illustration oxygen binding characteristics of hemoglobin. • Describe the oxy-hemoglobin dissociation pattern at rest & during exercise. • List & explain the factors causing right / left shift of oxy-hemoglobin dissociation curve. • Compare and contrast the oxy-hemoglobin dissociation curve of fetal hemoglobin with that of adult hemoglobin. • List the three methods of carbon-di-oxide transport in blood and explain each of them. • Explain the chloride shift phenomenon in the transport of carbon-di-oxide as bicarbonate ions. • Describe the carbon-di-oxide dissociation curve and list the factors affecting carbon-di-oxide dissociation curve. • Explain the role of Bohr & Haldane effects on right / left shift of carbon-di-oxide dissociation curve. • Explain the effects hyper & hypo ventilation on blood carbon-di-oxide

	levels. • List the peripheral & central chemoreceptors regulating respiration & explain the mechanism of chemical regulation of respiration. • List the centers of respiration in medulla & pons and describe their role in the control of respiration. • Describe the role of Hering-Breuer reflex in neural regulation of respiration. • List the different types abnormal patterns of breathing & explain the basis. • Discuss with diagrams the types of periodic breathing and list the causes of each type. • Briefly describe the mechanism of cough reflex, sneezing reflex & deglutition apnoea.
PY 6.4	Describe and discuss the physiology of high altitude and deep sea diving. • Describe the process of acclimatization to high altitude. • Describe the features of acute and chronic mountain sickness & basis of its treatment. • Mention the hazards of deep-sea diving and explain the basis of various hazards of deep sea diving with specific reference to nitrogen narcosis and Decompression sickness Bends, Caisson's disease) • Explain how Decompression sickness can be prevented and treated
PY6.5	Describe and discuss the principles of artificial respiration, oxygen therapy, acclimatization and decompression sickness. • List the different methods of artificial respiration and cardiopulmonary resuscitation and its principle. • Define hypoxia, classify hypoxia with examples • Describe the role of oxygen therapy in hypoxia and list the side effects of 100% oxygen therapy.
PY6.6	Describe and discuss the pathophysiology of dyspnoea, hypoxia, cyanosis asphyxia; drowning, periodic breathing • Define hypoxia. List the causes and types of hypoxia and discuss the pathophysiology of each types in detail. • Define apnoea • Define dyspnoea and understand the concept of dyspneic index. • Define asphyxia and list few major causes. • Describe the mechanism of death in drowning • Define cyanosis. Differentiate between central and peripheral cyanosis and list the causes.
PY6.7	Describe and discuss lung function tests & their clinical significance • Describe the various lung volumes & capacities with its normal ranges • Draw and label a normal spirogram • List the static & dynamic lung volumes & capacities.

	• Briefly discuss the methods of determining FRC & RV • Draw a flow-volume loop and explain the determinants of its components • Define minute ventilation, alveolar ventilation, maximum voluntary ventilation, breathing reserve and calculate the normal values • Explain the differences in obstructive & restrictive lung pathologies using a flow – volume loop. • Differentiate between obstructive & restrictive lung diseases • Describe the application of lung function tests in clinical practice
PY6.8	Demonstrate the correct technique to perform & interpret Spirometry • Perform spirometry
PY6.9	Demonstrate the correct clinical examination of the respiratory system in a normal volunteer or simulated environment • Perform clinical examination of respiratory system
PY6.10	Demonstrate the correct technique to perform measurement of peak expiratory flow rate in a normal volunteer or simulated environment • Perform recording of peak expiratory flow rate
Topic: Renal Physiology – 12 hrs	
Number	Competency
PY 7.1	Describe structure and function of kidney • Describe the functional anatomy of kidney • Describe the blood supply of the kidney and list its peculiarities • Describe the regulation of blood flow to the kidneys and state how it is measured • List the excretory functions of kidney • List the non-excretory functions of kidney • Define nephron. Describe the various parts of nephron • Distinguish between cortical and juxta medullary nephrons
PY 7.2	Describe the structure and functions of juxta glomerular apparatus and role of renin-angiotensin system • Describe the Juxta Glomerular Apparatus with a labelled diagram • List the functions of Juxta Glomerular Apparatus • List the factors that activate the renin-angiotensin-aldosterone system (RAAS) • With a flow diagram indicate the RAAS pathway • Discuss the role of the RAAS with regards to (a) blood pressure regulation (b) fluid and volume balance
PY 7.3	Describe the mechanism of urine formation involving processes of filtration, tubular reabsorption & secretion; concentration and diluting mechanism • Discuss the characteristics of the filtration membrane

	• Define Glomerular Filtration rate and state its normal value • Discuss the determinants of glomerular filtration rate • Explain how GFR can be measured • Explain Tubulo-glomerular feedback and glomerulo-tubular balance • Describe the Proximal tubular functions • Describe the renal handling of sodium • Describe the renal handling of potassium • Describe the renal handling of water • Explain obligatory and facultative reabsorption of water • Explain the renal handling of glucose • Discuss the concept of transport maximum and renal plasma threshold for glucose • Explain the reabsorption of amino acids, urea • Describe renal handling of calcium, magnesium, and phosphate • Describe the factors influencing genesis of medullary gradient • Describe the role of countercurrent multiplier and exchanger systems • List various conditions leading to loss of concentrating and diluting ability of nephron • Indicate the site and mechanisms action of common diuretics
PY 7.4	Describe & discuss the significance & implication of Renal clearance • Define clearance • Describe how renal clearance can be used to measure GFR with specific regard to (a) substances used (b) limitations of different substances • Describe how renal clearance can be used to measure Renal plasma flow (RPF) • Given representative values, calculate GFR and RPF using the principle of renal clearance and interpret the result
PY 7.5	Describe the renal regulation of fluid and electrolytes & acid-base Balance • Discuss the methods of acidification of urine in different parts of the renal tubules • Discuss the regulation of HCO_3^- reabsorption • Discuss the role of osmoreceptors, thirst and Angiotensin II in regulating water balance • Describe the role of ADH in water balance. To list the clinical features of diabetes insipidus and explain the physiological basis
PY 7.6	Describe the innervations of urinary bladder, physiology of micturition and its abnormalities • Describe the functional anatomy of urinary bladder • Describe the innervation of urinary bladder with the help of a diagram

	• Describe micturition reflex • Describe the functional abnormalities of urinary bladder
PY 7.7	Describe artificial kidney, dialysis and renal transplantation • List the types of renal failure (acute, Chronic) and list the clinical features • Describe the principle of dialysis • List the differences between haemodialysis and peritoneal dialysis
PY 7.8	Describe & discuss Renal Function Tests • List tests for urine analysis • List blood analysis for renal function • List the different concentration and dilution tests of urinary function
PY 7.9	Describe cystometry and discuss the normal cystometrogram • Describe the method by which a cystometrogram is generated • Draw and label a normal cystometrogram • Discuss the phases of the cystometrogram
Topic: Endocrine Physiology – 16 hrs	
Number	Competency
PY 8.1	Describe the physiology of bone and calcium metabolism • List the bone cells and enumerate their functions • Enumerate normal serum calcium and the important functions of calcium • Describe the normal distribution and daily requirements of calcium in the body • Describe the hormonal regulation of calcium homeostasis (parathyroid, Calcitonin, Vitamin D)
PY 8.2	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas and hypothalamus. • Define hormone • List all the endocrine organs and the major hormones secreted in each. • Describe the mechanism of action and regulation of secretion of hormones • Define second messenger system • List the various second messenger systems • Describe upregulation and down regulation. • Differentiate between genomic and non-genomic effects • Define the term paracrine and autocrine and give an example for each • List the methods of assessing Hormone levels (bioassays, RIA, ELIZA) • Describe the synthesis, secretion, transport, physiological actions,

	regulation and effect of altered (hypo and hyper) secretion of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas and hypothalamus.
PY 8.3	Describe the physiology of Thymus and Pineal gland. • Discuss the functions of the thymus. • Describe the physiological actions of melatonin. • List functions of Pineal gland • Discuss the effects of thymectomy
PY 8.4	Describe function tests: Thyroid gland, Adrenal cortex, Adrenal medulla and Pancreas. • Describe thyroid, adrenal cortex, adrenal medulla and pancreatic function tests.
PY 8.5	Describe the metabolic and endocrine consequences of obesity and metabolic syndrome, stress response. Outline the psychiatry component pertaining to metabolic syndrome. • Define obesity • Classify the different types of obesity • List the criteria to diagnose metabolic syndrome • Discuss obesity as a risk factor for enhanced cardio-metabolic disease • Discuss the effects of stress response. • Discuss the psychological /psychiatric components of eating disorders and the psychological/psychiatric consequences of obesity (stigma, labeling, self-esteem etc.)
PY 8.6	Describe and differentiate the mechanism of action of steroid, protein and amine hormones. • List the various types of hormone-receptors with examples for each • Define Hormone-receptor interaction • Describe & differentiate the mechanism of action of steroid, protein and amine hormones.
Topic: Reproductive Physiology – 10 hrs	
Number	Competency
PY 9.1	Describe and discuss sex determination, sex differentiation and their abnormalities and outline psychiatry and practical implication of sex determination • Distinguish sex chromosomes from somatic chromosomes • Describe the basis of chromosomal sex differentiation • Describe Barr bodies and their use • Describe the basis of gonadal differentiation • Describe the regulation of sex differentiation and development • Describe the intra-uterine differentiation of the internal and external

	genitalia • Discuss the legal implications of sex determination prenatally • List the physiological basis for the key features of the following conditions: ✓ Klinefelter syndrome ✓ Turner's syndrome ✓ True hermaphrodite ✓ Pseudohermaphrodite
PY 9.2	Describe and discuss Puberty: onset, progression, stages; early and delayed puberty and outline adolescent clinical and psychological association. • Define the terms: puberty, menarche and adrenarche • State the age range at which puberty occurs in males and females • Describe the factors that affect the onset of puberty • Describe the normal stages of puberty as described by Marshall and Turner • Describe the secondary sexual characteristics in males and females • Briefly describe: a) precocious puberty b) delayed puberty • List the psychological changes that are associated with normal, early and delayed puberty
PY 9.3	Describe Male reproductive system: functions of testis and control of spermatogenesis & factors modifying it and outline its association with psychiatric illness • Describe the functional anatomy of the male reproductive system • Describe the functions of the testis, prostate gland and seminal vesicles • List the stages of spermatogenesis with a diagram • Describe the factors that control and affect spermatogenesis • Describe the biological actions of testosterone (including mood, cognition and behavior) • Describe the hypothalamo–pituitary–gonadal axis in male. • Describe the characteristic features and components of semen • Describe the endocrine functions of testis • Explain the functions of Sertoli cells • Briefly describe: a) Cryptorchidism b) Hypogonadism in males c) Male infertility d) Vasectomy

PY 9.4	Describe Female reproductive system: (a) functions of ovary and its control; (b) menstrual cycle - hormonal, uterine and ovarian changes • Describe the functional anatomy of the female reproductive system • With regard to the ovary: ○ List the ovarian hormones and describe the physiological actions of each ○ Describe the control of ovarian function • List the phases of the normal menstrual cycle and indicate their approximate durations • Describe with diagrams the uterine changes of the menstrual cycle with hormonal basis. • Describe with diagrams the ovarian cycle with hormonal basis • Describe the hypothalamo-pituitary-gonadal axis in females. • Describe the tests for ovulation • Explain the following terms a) amenorrhea b) menorrhagia c) menopause d) anovulatory menstrual cycle
PY 9.5	Describe and discuss Physiological effects of sex hormones. • List the sex hormones in the male and female • Describe the regulation of sex hormone secretion in the male and female • List the actions of the sex hormones on the different organs/systems of the body • List clinical conditions where sex hormones may need to be suppressed or administered
PY 9.6	Enumerate the contraceptive methods for male and female. Discuss their advantages & disadvantages. • Classify the contraceptive methods for male and female. Describe briefly the mechanism of action of each • List the advantages and disadvantages of each method • Describe the permanent methods of contraception in male and female
PY 9.7	Describe and discuss the effects of removal of gonads on physiological functions • List the functions of the gonads in the male and female • Describe the effects of removal of the gonads at different stages of life
PY 9.8	Describe and discuss the physiology of pregnancy, parturition lactation and outline the psychology and psychiatry-disorders associated with it. • Describe the development of the fertilized ovum to an early embryo • Describe the structure and functions of the placenta • List the placental hormones and describe their functions • Describe the function of the feto-placental unit • Briefly describe the physiological changes in the mother during pregnancy. • List the factors that increase uterine contractility at birth • Describe the mechanics of parturition and its stages • Describe the hormonal regulation of breast development and lactation

	• Describe the milk ejection reflex • Briefly describe the emotional changes that a mother experiences during and after pregnancy
PY 9.9	Interpret a normal semen analysis report including (a) sperm count, (b) sperm morphology and (c) sperm motility, as per WHO guidelines and discuss the results • Describe the normal semen parameters in terms of (a) volume (b) sperm count, (c) sperm morphology and (d) sperm motility • Discuss the factors that can affect sperm count and quality • Define the following terms (a) oligospermia (b) azoospermia
PY 9.10	Discuss the physiological basis of various pregnancy tests • List the various tests of pregnancy with physiological basis. • Discuss the immunological methods used to confirm pregnancy
PY 9.11	Discuss the hormonal changes and their effects during perimenopause and menopause • Define perimenopause and menopause • Discuss the hormonal changes that occur during perimenopause and menopause and functional changes that occur in different systems • Discuss the uses and side effects of hormone replacement therapy (HRT)
PY 9.12	Discuss the common causes of infertility in a couple and role of IVF in managing a case of infertility. • List the common causes of infertility in the male and female • Discuss the approach and tests for infertility • List the new reproductive technologies that are available for an infertile couple
Topic: Neurophysiology – 37 hrs	
Number	Competency
PY 10.1	Describe and discuss the organization of nervous system. • Describe the organization and functions of nervous system • Describe a neuron and its types • Enumerate the types and function of Glial Cells. • List the structural features of the blood brain barrier • State the sites of production and removal of CSF • Tabulate the composition of CSF against plasma • List the functions of CSF • Discuss clinical applications of CSF analysis • Describe the procedure and uses of a lumbar puncture • Describe the different types of hydrocephalus

PY 10.2	Describe and discuss the functions and properties of synapse, reflex, receptors. • Draw a diagram of a synapse and label its parts • List different types of synapses • Describe synaptic transmission • Enumerate and explain the properties of synapses • Distinguish between electrical and chemical synapse • Differentiate between EPSP and IPSP • Define receptors. Classify receptors based on types of stimulus and location • Describe the structure and functions of each sensory receptor • Define receptor potential. Describe the mechanism of genesis of receptor potential • Define the receptive field and indicate its importance • Discuss the properties of receptors. • Draw and label a reflex arc • Classify reflexes and discuss the properties of reflexes
PY 10.3	Describe and discuss somatic sensations and sensory tracts. • List and classify sensory modalities. • Discuss the arrangement of tracts of ascending pathways in the cross section of spinal cord. • Describe the anterolateral pathway with a neat labelled diagram. List the sensations carried it. • Describe the dorsal column pathway with a neat labelled diagram. List the sensations carried by it. • Compare and contrast the dorsal column and spinothalamic tracts. • Define and classify pain. List the nociceptive stimuli. Enumerate types of pain • Describe the pain pathways with neat labelled diagrams. (Neospinothalamic and Paleospinothalamic tracts) • Discuss the gate control theory of pain • Explain the differences between somatic and visceral pain • Define referred pain. Explain the theories of referred pain • Describe the endogenous analgesic / pain modulating systems
PY 10.4	Describe and discuss motor tracts, mechanism of maintenance of tone, control of body movements, posture and equilibrium and vestibular apparatus. • List the descending tracts • Describe the cortico bulbar and cortico spinal tract (pyramidal tract) from its origin to termination with a diagram and list its functions • Describe the extrapyramidal tracts (vestibulospinal, rubrospinal, reticulospinal, olivospinal, tectospinal) and their functions • Distinguish between upper and lower motor neuron lesion

	• Define hemiplegia and describe the clinical features • Describe the structure of the muscle spindle and its innervation in a diagram • Define muscle tone • Describe the importance of alpha-gamma co-activation • Describe the Golgi tendon organ and its function. • Describe the following reflexes: stretch, inverse-stretch, withdrawal, crossed extensor reflex • Distinguish between decerebrate and decorticate rigidity. • Distinguish between classical and ischemic decerebrate rigidity. • Describe the righting reflexes. • Enumerate and describe the structures constituting the vestibular apparatus • Describe the neuronal connections of vestibular apparatus with the central nervous system. • List the functions of the vestibular apparatus • Enumerate the clinical disorders associated with the vestibular apparatus, and the tests that are performed in suspected vestibular dysfunction. • Classify the lobes of cerebellum according to their physiological functions (Cerebellum also covered in PY 10.4) • List the layers of the cerebellum and describe the internal circuitry and its function • List the deep nuclei of cerebellum and their function • List the afferent and efferent pathways of cerebellum and their functions • Enumerate the functions of cerebellum • List the features of cerebellar lesions and the clinical tests performed for cerebellar dysfunctions
PY 10.5	Describe and discuss structure and functions of reticular activating system, autonomic nervous system (ANS.) • Describe the location of the reticular activating system and its connections • List the functions of the reticular activating system • Describe the organization and functions of the autonomic nervous system (ANS) • List the neurotransmitters involved in the ANS and common blockers that are used clinically • List the common causes and symptoms of autonomic dysfunctions • List the tests of autonomic function
PY 10.6	Describe and discuss spinal cord, its functions, lesion and sensory disturbances. • Describe the parts of the spinal cord and the arrangement of spinal nerves • Depict in a cross-sectional diagram of the spinal cord the location of

	ascending and descending tracts • Describe and explain the effects of hemi section and complete transection of the spinal cord • Describe the features of spinal shock • Describe and explain briefly other spinal cord lesions like Tabes dorsalis and Syringomyelia
PY 10.7	Describe and discuss functions of cerebral cortex, basal ganglia, thalamus, hypothalamus, cerebellum and limbic system and their abnormalities. • Name the lobes of cerebral cortex. • Describe the functions of the different lobes, the motor and sensory cortical areas and the association areas • Describe the layers of the cerebral cortex and their function • Describe the motor and sensory homunculus and its characteristics • Name the nuclei of the Basal Ganglia • Describe the neuronal circuits of the basal ganglia • Enumerate the functions of basal ganglia • Indicate the cause and features of Parkinson's disease and the principle of treatment • Describe other abnormal movements associated with lesions of parts of the basal ganglia • Describe the functions of the different nuclei of the thalamus • Describe the cause and features associated with Thalamic Syndrome • Describe the functions of the different parts of hypothalamus • List the anatomical structures comprising the Limbic System and in particular Papez circuit. • List the functions of Limbic system. • Describe Kluver Bucy Syndrome • Describe Sham rage • Describe connections and functions of cerebellum and cerebellar function tests.
PY 10.8	Describe and discuss behavioral and EEG characteristics during sleep and mechanism responsible for its production. • List the different 'wave forms' of EEG and state their characteristics • Describe the physiological basis of EEG • List the uses of EEG • List the stages of sleep • List the features of different stages of sleep • Discuss the physiological basis of sleep • Compare and contrast REM and NREM sleep • List the essential features of common sleep disorders

PY 10.9	Describe and discuss the physiological basis of memory, learning and speech. • Tabulate the differences of the Rt and Lt Cerebral hemispheres • Classify memory and list the stages of memory storage • Describe the physiological basis of learning and memory • Describe the key features of classical and operant conditioning • Define and classify amnesia and describe the basic features of these disorders and of Alzheimer's disease • Describe the pathways and areas in the brain involved in speech • List the types of Aphasias and give the salient features of each.
PY 10.10	Describe and discuss chemical transmission in the nervous system, (Outline the psychiatry element) • Define neurotransmitters • Explain the general characteristics of action of neurotransmitters • Give the physiological classification of neurotransmitters and explain their functions • Discuss the role of neurotransmitters in common psychiatric disorders like depression, psychoses, schizophrenia
PY 10.11	Demonstrate the correct clinical examination of the nervous system, higher functions, sensory system, motor system, reflexes, cranial nerves in a normal volunteer and simulated environment. • Perform the correct clinical examination of the nervous system, higher functions, sensory system, motor system, reflexes, cranial nerves
PY 10.12	Identify normal EEG forms • Given the EEG recording, Identify the various waves of the EEG (alpha block, sleep spindles)
PY 10.13	Describe and discuss perception of smell and taste sensation • List the primary taste receptors and their distribution • Explain the mechanism of taste receptor stimulation for different taste sensation • Trace the taste pathway with the help of a diagram • With the help of a diagram illustrate the structure of olfactory receptors • Trace the olfactory pathway
PY 10.14	Describe and discuss pathophysiology of altered smell and taste sensation • List and describe disorders of taste and smell • Describe the clinical tests for taste and smell
PY 10.15	Describe and discuss functional anatomy of ear and auditory pathways & physiology of hearing • Describe the various structural components of human ear • List the parts of the middle ear • Describe the functions of the middle ear • Describe the cochlea. • Draw and describe the organ of Corti • Describe the endocochlear potential

	• Describe the theories of hearing • Trace the auditory pathway
PY 10.16	Describe and discuss pathophysiology of deafness. Describe hearing tests • Describe the types of deafness and some common causes • Describe the tuning fork tests to assess deafness • Describe the role of audiometry in assessing deafness and list its advantages over tuning fork tests • Describe the role of tympanogram
PY 10.17	Describe and discuss functional anatomy of eye, physiology of image formation, physiology of vision including colour vision, refractive errors, colour blindness, physiology of pupil and light reflex • Define refractive index. • Draw a reduced eye. • List the errors of refraction and indicate diagrammatically how they can be corrected. • Define accommodation of the eye and explain the mechanisms involved • Describe Purkinje Sanson images and their use • Describe how aqueous humor is formed and drained. List and describe the different types of glaucoma • Describe layers of the retina • Differentiate between the rods and cones • Describe the transduction of light • Define photopic and scotopic vision; describe the phenomenon of dark and light adaptation • Explain theories of color vision • List the types of color blindness and the methods used to test for them • List the pupillary reflexes and trace their pathways • List the features of Argyll Robertson pupil
PY 10.18	Describe and discuss the physiological basis of lesion in visual Pathway • Trace the visual pathways • List and describe disorders of visual fields in relation to the visual pathway • List the cortical visual areas and their function
PY 10.19	Describe and discuss auditory & visual evoke potentials • Explain evoked potential • Discuss the physiological and clinical uses of auditory and visually evoked potentials

PY 10.20	Demonstrate (i) Testing of visual acuity, colour and field of vision and (ii) hearing (iii) Testing for smell and (iv) taste sensation in volunteer/ simulated environment • Perform (i) Testing of visual acuity, colour and field of vision and (ii) hearing (iii) Testing for smell and (iv) taste sensation
Topic: Integrated Physiology – 6 hrs	
Number	Competency
PY 11.1	Describe and discuss mechanism of temperature regulation • Define the normal range of body temperature • Discuss the modes of heat loss from the body • Describe the mechanisms of heat production in the body • Discuss the role of the skin in regulation of body temperature • Describe the function of Hypothalamus as the thermostat of the body
PY 11.2	Describe and discuss adaptation to altered temperature (heat and cold) • Describe the changes occurring in the body when exposed to higher temperatures • Describe the changes occurring in the body when exposed to lower temperatures • List the behavioral methods used to control ambient and body temperature
PY 11.3	Describe and discuss mechanism of fever, cold injuries and heat Stroke • Discuss the abnormality in body temperature regulation in fever • Describe the pathophysiology and management of heat stroke • Describe the pathophysiology and management of frost bite
PY 11.4	Describe and discuss cardio-respiratory and metabolic adjustments during exercise; physical training effects • Describe the acute cardio respiratory and metabolic responses to whole body isotonic and resistance exercise • Distinguish between endurance and resistance physical training • List the tests to evaluate progress with endurance / resistance physical training • Describe the whole body and skeletal muscle effects of sustained endurance / resistance training • Define exercise, grading, type, oxygen debt
PY 11.5	Describe and discuss physiological consequences of sedentary Lifestyle • Define sedentary lifestyle. (what is physical inactivity) • Describe the physiological consequences of sedentary lifestyle • What are current recommendations for Physical activity? • List the methods to assess physical activity of an individual

	Describe the pathways through which sedentary lifestyle increases cardio-metabolic risk
PY 11.6	Describe physiology of infancy. - Define the following terms i) perinatal ii) neonatal iii) infancy - Describe the changes in infancy (the first year of life) with regard to the following: - growth and weight gain - developmental milestones - nervous system changes - cardiovascular system - respiratory system - gastrointestinal system - endocrine system - renal and urinary system - hematological and immune function
PY 11.7	Describe and discuss physiology of aging; free radicals and antioxidants - Distinguish between chronological and biological age - List the various theories of aging - Describe the role of free radicals and the antioxidants in aging - Describe the system wise changes that occur with aging (including diseases of ageing) - Define cellular senescence
PY 11.8	Discuss & compare cardio-respiratory changes in exercise (isometric and isotonic) with that in the resting state and under different environmental conditions (heat and cold) - Compare and contrast the acute cardiac, vascular and respiratory responses to isometric and isotonic exercise in thermoneutral conditions - Compare and contrast cardiac, vascular and respiratory responses to exercise in conditions of acute and chronic heat and cold conditions. - Highlight the differences in cardiorespiratory responses to exercise in heat and cold from those in thermoneutral conditions
PY 11.9	Interpret growth charts - Define growth chart - List the types of growth chart - Define: stunting, wasting, failure to thrive - Interpret the WHO / IAP weight-for-age growth chart for the given data (case history)

PY 11.10	Interpret anthropometric assessment of infants □ List the parameters used for anthropometric assessments in infants - height, weight, head circumference, mid arm circumference. Mention the normal values. □ Clinical implications of anthropometric assessments in infants
PY 11.11	Discuss the concept, criteria for diagnosis of Brain death and its Implications • Define brain death • List the criteria for diagnosing brain death (distinguish from coma) • Explain the implications of brain death (including legal and organ donation issues)
PY 11.12	Discuss the physiological effects of meditation • Describe the physiological changes seen with meditation with regards to: ○ Neuroendocrine (cognitive, autonomic function, EEG, sleep, HPA axis) ○ cardiorespiratory function ○ metabolic activity
PY 11.13	Obtain history and perform general examination in the volunteer / simulated environment • Perform general physical examination after obtaining history
PY 11.14	Demonstrate Basic Life Support in a simulated environment • Perform Basic life support

Integration Topics

HUMAN ANATOMY				
Sl No	Competency Number	Competency	Vertical Integration	Horizontal Integration
1	AN3.1	Classify muscle tissue according to structure &		Physiology

		action		
2	AN5.1	Differentiate between blood vascular and lymphatic system		Physiology
3	AN5.2	Differentiate between pulmonary and systemic circulation		Physiology
4	AN5.6	Describe the concept of anastomoses and collateral circulation with significance of end-arteries	General Medicine	Physiology
5	AN5.7	Explain function of meta-arterioles, precapillary sphincters, arterio-venous anastomoses		Physiology
6	AN5.8	Define thrombosis, infarction & aneurysm	Pathology	Physiology
7	AN7.2	List components of nervous tissue and their functions		Physiology
8	AN7.3	Describe parts of a neuron and classify them based on number of neurites, size & function		Physiology
9	AN7.5	Describe principles of sensory and motor innervation of muscles	General Medicine	Physiology
10	AN7.7	Describe various types of synapse		Physiology

11	AN21.9	Describe & demonstrate mechanics and types of respiration		Physiology
12	AN22.2	Describe & demonstrate external and internal features of each chamber of heart		Physiology
13	AN22.3	Describe & demonstrate origin, course and branches of coronary arteries		Physiology
14	AN22.4	Describe anatomical basis of ischaemic heart disease	General Medicine	Physiology
15	AN22.7	Mention the parts, position and arterial supply of the conducting system of heart	General Medicine	Physiology
16	AN24.1	Mention the blood supply, lymphatic drainage and nerve supply of pleura, extent of pleura and describe the pleural recesses and their applied anatomy	General Medicine	Physiology
17	AN24.2	Identify side, external features and relations of structures which form root of lung & bronchial tree and their clinical correlate	General Medicine	Physiology
18	AN24.3	Describe a bronchopulmonary segment	General Medicine	Physiology
19	AN25.3	Describe fetal circulation and changes occurring at birth	General Medicine	Physiology

20	AN25.4	Describe embryological basis of: 1) atrial septal defect, 2) ventricular septal defect, 3) Fallot's tetralogy & 4) tracheo-oesophageal fistula	General Medicine, Pediatrics	Physiology
21	AN25.5	Describe developmental basis of congenital anomalies, transposition of great vessels, dextrocardia, patent ductus arteriosus and coarctation of aorta	General Medicine, Pediatrics	Physiology
22	AN25.9	Demonstrate surface marking of lines of pleural reflection, Lung borders and fissures, Trachea, Heart borders, Apex beat & Surface projection of valves of heart	General Medicine, Pediatrics	Physiology
23	AN56.2	Describe circulation of CSF with its applied anatomy	General Medicine	Physiology
24	AN57.4	Enumerate ascending & descending tracts at mid thoracic level of spinal cord	General Medicine	Physiology
25	AN57.5	Describe anatomical basis of syringomyelia	General Medicine	Physiology
26	AN58.3	Enumerate cranial nerve nuclei in medulla oblongata with their functional group		Physiology
27	AN58.4	Describe anatomical basis & effects of medial & lateral	General Medicine	Physiology

		medullary syndrome		
28	AN59.1	Identify external features of pons		Physiology
29	AN60.3	Describe anatomical basis of cerebellar dysfunction	General Medicine	Physiology
30	AN61.3	Describe anatomical basis & effects of Benedikt's and Weber's syndrome	General Medicine	Physiology
31	AN62.2	Describe & demonstrate surfaces, sulci, gyri, poles, & functional areas of cerebral hemisphere	General Medicine	Physiology
32	AN62.3	Describe the white matter of cerebrum	General Medicine	Physiology
33	AN62.4	Enumerate parts & major connections of basal ganglia & limbic lobe	General Medicine	Physiology
34	AN62.5	Describe boundaries, parts, gross relations, major nuclei and connections of dorsal thalamus, hypothalamus, epithalamus, metathalamus and subthalamus	General Medicine	Physiology
35	AN62.6	Describe & identify formation, branches & major areas of distribution of circle of Willis	General Medicine	Physiology
36	AN63.1	Describe & demonstrate parts, boundaries & features of IIIrd, IVth & lateral		Physiology

		ventricle		
37	AN63.2	Describe anatomical basis of congenital hydrocephalus	Pediatrics	Physiology
38	AN66.1	Describe & identify various types of connective tissue with functional correlation		Physiology
39	AN67.2	Classify muscle and describe the structure-function correlation of the same		Physiology
40	AN68.2	Describe the structure-function correlation of neuron		Physiology
41	AN69.2	Describe the various types and structure-function correlation of blood vessel		Physiology

BIOCHEMISTRY				
Sl No	Competency Number	Competency	Vertical Integration	Horizontal Integration
1	BI1.1	Describe the molecular and functional organization of a cell and its sub-cellular components.		Physiology
2	BI3.7	Describe the common poisons that inhibit crucial enzymes of carbohydrate metabolism (eg; fluoride, arsenate)		Physiology

3	BI5.2	Describe and discuss functions of proteins and structure-function relationships in relevant areas eg, hemoglobin and selected hemoglobinopathies	Pathology, General Medicine	Physiology
4	BI6.3	Describe the common disorders associated with nucleotide metabolism.		Physiology
5	BI6.7	Describe the processes involved in maintenance of normal pH, water & electrolyte balance of body fluids and the derangements associated with these.	General Medicine	Physiology
6	BI6.9	Describe the functions of various minerals in the body, their metabolism and homeostasis.	General Medicine	Physiology
7	BI6.11	Describe the functions of haem in the body and describe the processes involved in its metabolism and describe porphyrin metabolism.	Pathology, General Medicine	Physiology
8	BI6.12	Describe the major types of haemoglobin and its derivatives found in the body and their physiological/ pathological relevance.	Pathology, General Medicine	Physiology
9	BI6.13	Describe the functions of the kidney, liver, thyroid and	Pathology, General	Physiology, Human Anatomy

		adrenal glands.	Medicine	
10	BI6.14	Describe the tests that are commonly done in clinical practice to assess the functions of these organs (kidney, liver, thyroid and adrenal glands).	Pathology, General Medicine	Physiology, Human Anatomy
11	BI6.15	Describe the abnormalities of kidney, liver, thyroid and adrenal glands.	Pathology, General Medicine	Physiology, Human Anatomy
12	BI10.4	Describe & discuss innate and adaptive immune responses, self/non-self recognition and the central role of T-helper cells in immune responses.	General Medicine, Pathology	Physiology
13	BI11.4	Perform urine analysis to estimate and determine normal and abnormal constituents	General Medicine	Physiology

PATHOLOGY				
SI No	Competency Number	Competency	Vertical Integration	Horizontal Integration
1	PA26.3	Define and describe the etiology, types, pathogenesis, stages, morphology and complications and evaluation of Obstructive airway disease (OAD) and	Physiology, General Medicine	Microbiology

		bronchiectasis		
2	PA27.3	Describe the etiology, types, stages pathophysiology pathology and complications of heart failure	General Medicine, Physiology	
3	PA27.8	Interpret abnormalities in cardiac function testing in acute coronary syndromes	Physiology, General Medicine	
4	PA27.9	Classify and describe the etiology, types, pathophysiology, pathology, gross and microscopic features, diagnosis and complications of cardiomyopathies	General Medicine, Physiology	
5	PA28.5	Define and classify glomerular diseases. Enumerate and describe the etiology, pathogenesis, mechanisms of glomerular injury, pathology, distinguishing features and clinical manifestations of glomerulonephritis	Physiology, General Medicine	
6	PA32.1	Enumerate, classify and describe the etiology, pathogenesis, pathology and iodine dependency of thyroid swellings	Human Anatomy, Physiology, General Medicine, General Surgery	
7	PA32.2	Describe the etiology, cause, iodine dependency,	Physiology, General	

		pathogenesis, manifestations, laboratory and imaging features and course of thyrotoxicosis	Medicine	
8	PA32.3	Describe the etiology, pathogenesis, manifestations, laboratory and imaging features and course of thyrotoxicosis/ hypothyroidism	Physiology, General Medicine	
9	PA32.4	Classify and describe the epidemiology, etiology, pathogenesis, pathology, clinical laboratory features, complications and progression of diabetes mellitus	Physiology, General Medicine	
10	PA32.5	Describe the etiology, genetics, pathogenesis, manifestations, laboratory and morphologic features of hyperparathyroidism	Physiology, General Medicine	
11	PA32.7	Describe the etiology, pathogenesis, manifestations, laboratory, morphologic features, complications of adrenal insufficiency	Physiology, General Medicine	
12	PA32.8	Describe the etiology, pathogenesis, manifestations, laboratory, morphologic features, complications of Cushing's syndrome	Physiology, General Medicine	

13	PA32.9	Describe the etiology, pathogenesis, manifestations, laboratory and morphologic features of adrenal neoplasms	Human Anatomy, Physiology, General Medicine, General Surgery	

PHARMACOLOGY				
SI No	Competency Number	Competency	Vertical Integration	Horizontal Integration
1	PH1.15	Describe mechanism/s of action, types, doses, side effects, indications and contraindications of skeletal muscle relaxants	Anesthesiology, Physiology	
2	PH1.19	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act on CNS, (including anxiolytics, sedatives & hypnotics, antipsychotic, antidepressant drugs, anti-manics, opioid agonists and antagonists, drugs used for neurodegenerative disorders, antiepileptics Drugs)	Psychiatry, Physiology	
3	PH1.25	Describe the mechanism/s of action, types, doses, side effects, indications and	Physiology, General Medicine	

		contraindications of the drugs acting on blood, like anticoagulants, antiplatelets, fibrinolytics, plasma expanders		
4	PH1.26	Describe mechanisms of action, types, doses, side effects, indications and contraindications of the drugs modulating the renin angiotensin and aldosterone system	Physiology, General Medicine	
5	PH1.35	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in hematological disorders like: 1. Drugs used in anemias Colony Stimulating factors	General Medicine, Physiology	Pharmacology

FORENSIC MEICINE AND TOXICOLOGY				
Sl No	Competency Number	Competency	Vertical Integration	Horizontal Integration
1	FM14.7	Demonstrate & identify that a particular stain is blood and identify the species of its origin.	Pathology, Physiology	
2	FM14.8	Demonstrate the correct technique to perform and identify ABO & Rh blood group of a person.	Pathology, Physiology	

ANAESTHESIOLOGY				
Sl No	Competency Number	Competency	Vertical Integration	Horizontal Integration
1	AS7.3	Observe and describe the management of an unconscious patient	Physiology	General Medicine
2	AS7.4	Observe and describe the basic setup process of a ventilator	Physiology	General Medicine
3	AS8.1	Describe the anatomical correlates and physiologic principles of pain	Human Anatomy, Physiology	
4	AS8.2	Elicit and determine the level, quality and quantity of pain and its tolerance in patient or surrogate	Physiology	

OPHTHALMOLOGY				
Sl No	Competency Number	Competency	Vertical Integration	Horizontal Integration
1	OP1.1	Describe the physiology of vision.	Physiology	

GENERAL MEDICINE				
Sl	Competency	Competency	Vertical	Horizontal

No	Number		Integration	Integration
1	IM1.1	Describe and discuss the epidemiology, pathogenesis clinical evolution and course of common causes of heart disease including: rheumatic/ valvular, ischemic, hypertrophic inflammatory.	Pathology, Physiology	
2	IM1.2	Describe and discuss the genetic basis of some forms of heart failure	Pathology, Physiology	
3	IM1.3	Describe and discuss the aetiology microbiology pathogenesis and clinical evolution of rheumatic fever, criteria, degree of rheumatic activity and rheumatic valvular heart disease and its complications including infective endocarditis	Pathology, Physiology, Microbiology	
4	IM1.4	Stage heart failure	Pathology, Physiology	
5	IM1.5	Describe discuss and differentiate the processes involved in R Vs L heart failure, systolic vs diastolic failure	Pathology, Physiology	
6	IM1.6	Describe and discuss the compensatory mechanisms involved in heart failure including cardiac remodelling and	Pathology, Physiology	

		neurohormonal adaptations		
7	IM1.7	Enumerate, describe and discuss the factors that exacerbate heart failure including ischemia, arrhythmias anemia, thyrotoxicosis, dietary factors drugs etc.	Pathology, Physiology	
8	IM1.8	Describe and discuss the pathogenesis and development of common arrhythmias involved in heart failure particularly atrial fibrillation	Pathology, Physiology	
9	IM2.1	Discuss and describe the epidemiology, antecedents and risk factors for atherosclerosis and ischemic heart disease	Pathology, Physiology Community Medicine	
10	IM2.2	Discuss the aetiology of risk factors both modifiable and nonmodifiable of atherosclerosis and IHD	Pathology, Physiology	
11	IM2.3	Discuss and describe the lipid cycle and the role of dyslipidemia in the pathogenesis of atherosclerosis	Physiology, Biochemistry	
12	IM2.4	Discuss and describe the pathogenesis, natural history, evolution and complications of atherosclerosis and IHD	Pathology, Physiology	

13	IM5.1	Describe and discuss the physiologic and biochemical basis of hyperbilirubinemia	Pathology, Physiology	
14	IM5.2	Describe and discuss the aetiology and pathophysiology of liver injury	Pathology, Physiology	
15	IM8.1	Describe and discuss the epidemiology, aetiology and the prevalence of primary and secondary hypertension	Pathology, Physiology	
16	IM8.2	Describe and discuss the pathophysiology of hypertension	Pathology, Physiology	
17	IM11.22	Enumerate the causes of hypoglycaemia and describe the counterhormone response and the initial approach and treatment.	Pathology, Physiology	
18	IM12.1	Describe the epidemiology and pathogenesis of hypothyroidism and hyperthyroidism including the influence of iodine deficiency and autoimmunity in the pathogenesis of thyroid disease	Pathology, Physiology	
19	IM12.3	Describe and discuss the physiology of the hypothalamopituitary - thyroid axis, principles of thyroid function testing and alterations in physiologic	Pathology, Physiology	

		function		
20	IM15.3	Describe and discuss the physiologic effects of acute blood and volume loss	Pathology, Physiology	General Surgery
21	IM18.6	Distinguish the lesion based on upper vs lower motor neuron, side, site and most probable nature of the lesion	Physiology	
22	IM18.7	Describe the clinical features and distinguish, based on clinical examination, the various disorders of speech	Physiology	
23	IM18.8	Describe and distinguish, based on the clinical presentation, the types of bladder dysfunction seen in CNS disease	Physiology	
24	IM19.1	Describe the functional anatomy of the locomotor system of the brain	Human Anatomy, Physiology	
25	IM22.1	Enumerate the causes of hypercalcemia and distinguish the features of PTH vs non PTH mediated hypercalcemia	Pathology, Physiology	
26	IM22.9	Enumerate the causes and describe the clinical and laboratory features of metabolic acidosis	Physiology	
27	IM22.10	Enumerate the causes of describe the clinical and	Physiology	

		laboratory features of metabolic alkalosis		
28	IM22.11	Enumerate the causes and describe the clinical and laboratory features of respiratory acidosis	Physiology	
29	IM22.12	Enumerate the causes and describe the clinical and laboratory features of respiratory alkalosis	Physiology	
30	IM22.13	Identify the underlying acid based disorder based on an ABG report and clinical situation	Physiology	
31	IM23.1	Discuss and describe the methods of nutritional assessment in an adult and calculation of caloric requirements during illnesses	Physiology, Biochemistry	Pediatrics
32	IM23.2	Discuss and describe the causes and consequences of protein-caloric malnutrition in the hospital	Physiology, Biochemistry	Pediatrics
33	IM23.3	Discuss and describe the aetiology, causes, clinical manifestations, complications, diagnosis and management of common vitamin deficiencies	Physiology, Biochemistry	Pediatrics
34	IM23.4	Enumerate the indications for enteral and parenteral	Physiology, Biochemistry	Pediatrics

		nutrition in critically ill patients		
35	IM24.22	Describe and discuss the aetiopathogenesis, clinical presentation, complications, assessment and management of nutritional disorders in the elderly	Physiology, Biochemistry	

OBSTETRICS AND GYNAECOLOGY				
SI No	Competency Number	Competency	Vertical Integration	Horizontal Integration
1	OG3.1	Describe the physiology of ovulation, menstruation, fertilization, implantation and gametogenesis	Physiology	
2	OG7.1	Describe and discuss the changes in the genital tract, cardiovascular system, respiratory, haematology, renal and gastrointestinal systems in pregnancy	Physiology	

PAEDIATRICS				
SI No	Competency Number	Competency	Vertical Integration	Horizontal Integration
1	PE7.2	Explain the physiology of lactation	Physiology	

2	PE7.3	Describe the composition and types of breast milk and discuss the differences between cow's milk and human milk	Physiology	
3	PE10.1	Define, describe the etio-pathogenesis, classify including WHO classification, clinical features, complication and management of severe Acute Malnourishment and Moderate Acute Malnutrition	Physiology Biochemistry	
4	PE10.2	Outline the clinical approach to a child with SAM and MAM	Physiology, Biochemistry	
5	PE10.3	Assessment of a patient with SAM and MAM, diagnosis, classification and planning management including hospital and community based intervention, rehabilitation and prevention	Physiology, Biochemistry	
6	PE11.1	Describe the common etiology, clinical features and management of Obesity in children	Physiology, Biochemistry , Pathology	
7	PE11.2	Discuss the risk approach for obesity and discuss the prevention strategies	Physiology, Pathology	

8	PE12.7	Describe the causes, clinical features, diagnosis and management of Deficiency / excess of Vitamin D (Rickets and HypervitaminosisD	Biochemistr y, Physiology, Pathology	
9	PE12.8	Identify the clinical features of dietary deficiency of Vitamin D	Biochemistr y Physiology Pathology	
10	PE12.9	Assess patients with Vitamin D deficiency, diagnose, classify andplan management	Biochemistr y, Physiology, Pathology	
11	PE12.13	Discuss the RDA, dietary sources of Vitamin K and their role inhealth and disease	Biochemistr y, Physiology, Pathology	
12	PE12.14	Describe the causes, clinical features, diagnosis, management and prevention of of Deficiency of Vitamin K	Biochemistr y, Physiology, Pathology	
13	PE23.1	Discuss the Hemodynamic changes, clinical presentation, complications and management of Acyanotic Heart Diseases –VSD, ASD and PDA	Physiology Pathology	
14	PE23.2	Discuss the Hemodynamic changes, clinical presentation, complications	Physiology Pathology	

		and management of Cyanotic Heart Diseases – Fallot’s Physiology		
15	PE23.3	Discuss the etio-pathogenesis, clinical presentation and management of cardiac failure in infant and children	Physiology Pathology	
16	PE23.4	Discuss the etio-pathogenesis, clinical presentation and management of Acute Rheumatic Fever in children	Physiology Pathology	
17	PE23.5	Discuss the clinical features, complications, diagnosis, management and prevention of Acute Rheumatic Fever	Physiology Pathology	
18	PE23.6	Discuss the etio-pathogenesis and clinical features and management of Infective endocarditis in children	Physiology, Pathology, Microbiology	
19	PE29.1	Discuss the etio-pathogenesis, Clinical features, classification and approach to a child with anaemia	Pathology, Physiology	
20	PE29.2	Discuss the etio-pathogenesis, clinical features and management of Iron Deficiency anaemia	Pathology, Physiology	
21	PE29.3	Discuss the	Pathology,	

		etiopathogenesis, Clinical features and management of VIT B12, Folate deficiency anaemia	Physiology	
22	PE29.4	Discuss the etio-pathogenesis, clinical features and management of Hemolytic anemia, Thalassemia Major, Sickle cell anaemia, Hereditary spherocytosis, Auto-immune hemolytic anaemia and hemolytic uremic syndrome	Pathology Physiology	

GENERAL SURGERY				
Sl No	Competency Number	Competency	Vertical Integration	Horizontal Integration
1	SU1.1	Describe basic concepts of homeostasis, enumerate the metabolic changes in injury and their mediators	Physiology, Biochemistry	
2	SU2.1	Describe Pathophysiology of shock. Types of shock. Principles of resuscitation including fluid replacement and monitoring	Pathology, Physiology	
3	SU4.1	Elicit, document and present history in a case of Burns and perform physical examination. Describe Pathophysiology of Burns.	Physiology	

4	SU12.1	Enumerate the causes and consequences of malnutrition in the surgical patient.	Physiology	
5	SU12.2	Describe and Discuss the methods of estimation and replacement the Fluid and electrolyte requirements in the surgical patient	Physiology	
6	SU28.5	Describe the applied Anatomy and physiology of esophagus	Human Anatomy, Physiology	

RESPIRATORY MEDICINE				
Sl No	Competency Number	Competency	Vertical Integration	Horizontal Integration
1	CT2.1	Define and classify obstructive airway disease	Physiology, Pathology	
2	CT2.2	Describe and discuss the epidemiology risk factors and evolution of obstructive airway disease	Physiology, Pathology	
3	CT2.4	Describe and discuss the physiology and pathophysiology of hypoxia and hypercapnia	Physiology, Pathology	
4	CT2.5	Describe and discuss the genetics of alpha 1 antitrypsin deficiency	Physiology, Pathology	

		emphysema		
5	CT2.11	Describe, discuss and interpret pulmonary function tests	Physiology, Pathology	

Summary of TL methods and list of competencies to be covered in Physiology Phase I MBBS and Assessment methods

Sl. No.	Topic, Teaching hours and type	Competency numbers	Assessment methods
1.	General Physiology - 8 hrs Lecture, Interactive, SGD	PY1.1 -1.9	Written, Viva voce
2.	Haematology – 16 hrs Lecture, Interactive, SGD DOAP	PY2.1-2.10 PY2.11-2.13	Written, Viva voce Practical/OSPE/ Viva voce
3.	Nerve & Muscle Physiology -10hrs Lecture, Interactive, SGD DOAP, CAL	PY3.1-3.13 PY3.14-3.16, 3.18	Written, Viva voce Practical/OSPE/ Viva voce
4.	Gastro intestinal Physiology – 10 hrs Lecture, Interactive, SGD DOAP	PY 4.1-4.9 PY4.10	Written, Viva voce Skill assessment/ Viva voce/OSPE
5.	Cardiovascular Physiology – 25 hrs Lecture, Interactive, SGD DOAP	PY 5.1-5.11 PY5.12-5.16	Written, Viva voce Skill assessment/ Viva voce/OSPE
6.	Respiratory Physiology – 12 hrs Lecture, Interactive, SGD DOAP	PY 6.1-6.7 PY 6.8-6.10	Written, Viva voce Skill assessment/Practical/Vivavoce/OSPE

7.	Renal Physiology – 10 hrs Lecture, Interactive, SGD	PY 7.1-7.9	Written, Viva voce
8.	Endocrine Physiology – 16 hrs Lecture, Interactive, SGD	PY 8.1-8.6	Written, Viva voce
9.	Reproductive Physiology – 10 hrs Lecture, Interactive, SGD	PY 9.1-9.12	Written, Viva voce
10.	Neurophysiology – 37 hrs Lecture, Interactive, SGD DOAP	PY 10.1-10.19 PY 10.11 & 10.20	Written, Viva voce Skill assessment/ Practical/Vivavoce/OS PE
11.	Integrated Physiology – 6 hrs Lecture, Interactive, SGD DOAP	PY 11.1-11.12 PY 11.13 & 11.14	Written, Viva voce Skill assessment/ Viva voce/ OSPE

I MBBS – PHYSIOLOGY PRACTICAL SKILLS TO BE CERTIFIED

1. PY 5.12 Record blood pressure and pulse rate at rest.
2. PY 5.12 Record blood pressure and pulse rate in different grades of exercise.
3. PY 5.12 Record blood pressure and pulse rate in different postures.
4. PY 6.9 Demonstrate clinical examination of respiratory system.
5. PY 10.11 Demonstrate clinical examination of higher functions.
6. PY 10.11 Demonstrate clinical examination of sensory system.
7. PY 10.11 Demonstrate clinical examination of motor system.
8. PY 10.11 Demonstrate clinical examination of reflexes.
9. PY 10.11 Demonstrate clinical examination of cranial nerves.
10. PY 10.20 Demonstrate testing of visual acuity, colour vision and field of vision.
11. PY 10.20 Demonstrate testing of hearing.
12. PY 10.20 Demonstrate testing for smell.
13. PY 10.20 Demonstrate testing for taste sensation.

SCHEME OF EXAMINATION:

FORMATIVE ASSESSMENT

Scheme for calculation of Internal Assessment marks:

Formative assessment :			
Theory	30 Marks	Practicals	30 Marks
Day to Day Assessments/MCQs/Viva / tests	05	Practical records	05
Attitude/Communication skills	01	ECE Participation/Skill certification	05
Written Assignments	02		
Attendance	02 (for Theory + Practical attendance >90%) 01 (for Theory + Practical attendance 80-90%)		
Total	40		40

General Guidelines

(Includes eligibility for Summative assessment and Pass criteria)

- Regular periodic examinations shall be conducted throughout the course. There shall be minimum three internal assessment examinations in Physiology.
- The third internal examination shall be conducted on the lines of the university examination.
- There shall be one short essay on ECE in each internal assessment.
- There shall be at least one short question from AETCOM in the internal assessment.
- Questions on ECE and AETCOM in Internal Assessments must be assessed by the faculty of the respective pre-clinical departments (Anatomy/Physiology/Biochemistry).
- An average of the marks scored in the three internal assessment examinations will be considered as the final internal assessment marks.
- Learners must secure not less than 40 % marks in theory and practical separately and not less than 50% marks of the total marks (combined in theory and practical) assigned for internal assessment in a particular subject in order to be eligible for appearing at the final University examination of that subject.
- A candidate who has not secured requisite aggregate in the internal assessment may be subjected to remedial measures by the institution. If he/she successfully completes the remediation measures, he/she is eligible to appear for University Examination. Remedial measures shall be completed before submitting the internal assessment marks online to the university.

- Learners must have completed the required certifiable competencies in and completed the logbook to be eligible for appearing at the final Physiology university examination.

SUMMATIVE ASSESSMENT

Marks distribution for university exam

Theory		Practical	
Paper I	100	Practical exam	80
Paper II	100	Viva-voce	20
Total	200	Total	100
Internal assessment	40	Internal assessment	40

A. Theory: 200 marks

There shall be two theory papers of 100 marks each and duration of each paper will be 3 hours.

Type of question	Number of questions	Marks for each question	Total marks
Long essay	2	10	20
Short essay	8	5	40
Short answer	10	3	30
MCQs	10	1	10
Total marks			100

Blue print for theory question papers

Paper 1 (Max 100 marks)

Systems	Marks allotted
General Physiology	05
Hematology	20
Cardiovascular Physiology	25
Respiratory Physiology	20
Gastrointestinal Physiology	15
Renal Physiology	15

Paper 2 (Max 100 marks)	
Systems	Marks allotted
Nerve and muscle Physiology	12
Endocrine physiology	20
Reproductive physiology	15
Central nervous system	35
Special senses	10
Integrated Physiology	08

B. i) Practical: 80 marks

Practical session	Allotted topics	Marks allotted
Practical	Clinical examination – I (CNS – sensory / motor/ reflexes / cranial nerve)	15

– I	Chart: Clinical case histories	5
	Total	20
Practical – II	Clinical examination-II (CVS / RS)	15
	Clinical examination (general physical examination / abdomen examination)	5
	Total	20
Practical – III	Human experiments • Mosso's ergography • Effect of posture / exercise on BP and Pulse rate • Effect on BP and pulse rate during exercise using the Harvard step test • Record and interpret Lead II ECG • Spirometry and PEFr • Perimetry • Demonstrate BLS	15
	Chart: Amphibian charts (nerve muscle / cardiac)	5
	Total	20
Practical – IV	Hematology • RBC count • WBC count • Making a peripheral smear + DLC on the provided stained slide • BT + blood group • CT + blood group • Hb + blood group	15
	Chart: calculations / problem solving	5
	Total	20
	GRAND TOTAL	80

B. ii) Viva-voce: 20 marks

- The viva-voce examination shall carry 20 marks and all examiners will conduct the examination.
- Viva will focus on application and interpretation.
- Viva marks to be added to practical and not theory.

Annexure- Ia

SUGGESTED FORMAT FOR CERTIFICATION OF SKILLS IN PHYSIOLOGY GENERAL INSTRUCTIONS

General information:

1. There are 13 skills that need to be certified in Physiology
2. These skills will be tested in normal, healthy volunteers or simulated environment
3. The focus will be on whether students perform the procedures correctly
4. Since these are skills that need to be recertified at the end of clinical

training, this certification is a **“First level Certification”**

Role of the certifier:

1. Observe the student perform the skill without any prompting or interference
2. At the end of the assessment ask the specific questions that need to be asked (based on the skill checklist)
3. Grade the student (A, B, C, D – see below)
4. Give feedback to the student on the errors, if any, at the end of the skill assessment.
5. Fill in the Certification Sheet

Assessment

Professional conduct and communication:

1. Is the student adequately groomed
2. Does the student introduce him/herself, greet the subject and obtain consent?
3. Does the student use the hand sanitizer?
4. Does the student give clear instructions to the subject?
5. Does the student thank the subject?
6. Does the student use the hand sanitizer at the end of the session?

Skill specific assessment:

1. Has the student conducted the given assessment completely?
2. Has the student conducted the given assessment correctly?
(for the above two points please refer to the checklist for the specific skill)
3. How do you rate the student for this session?

Annexure Ib

CERTIFICATION SHEET – Blank Template:

Name of Student:

Subject:

Skill:

Competency Number:

Grading of Student (please circle the appropriate letter – A, B, C, D)

A	Student has performed the assessment without any error
B	Student has performed the assessment with minor errors that need to be rectified
C	Student has performed the assessment with major errors
D	Student has not been able to perform the assessment

SKILL CHECKLIST

Satisfactory (√), unsatisfactory (X)

	Attempt I Date:	Attempt II Date:	Attempt 'n' Date:
<u>Professional conduct and communication</u>			
Steps ☐ • • ...			
Grade			
Name and Signature of the assessor			
I have received detailed feedback on my performance including my grade, the errors that I have committed and actions to be taken. (student's signature)			

Certifiers name and signature with date of certification:

Signature of the student:

Annexure II

FORMAT FOR ASSESSING PARTICIPATION IN EARLY CLINICAL EXPOSURE SESSIONS

Session number:

Date:

Roll No:

Department visited:

Objectives:

1. Briefly describe what you learnt from this session/ clinical visit in relation to the objectives.

2. Apart from the above learning, what did you observe that influenced (Positive/negative)you?

Remarks of teacher: Satisfactory / Not satisfactory

Name and Signature of Teacher with date:

Annexure III

SUGGESTED FORMAT FOR AETCOM SESSIONS

Name of the Facilitator:

Date:

AETCOM module Number:

Session number:

AETCOM topic:

Competencies / Objectives:

1. Briefly describe what you learnt from this AETCOM session in relation to the objectives.

2. Apart from the above learning, what did you observe that influenced (Positive/negative) you during this session?

Remarks by Facilitator:

Signature of Facilitator:

Annexure IV

SUGGESTED TEXT BOOKS

Note: A single text book may not cover the entire curriculum. Referring to more than one book is recommended.

TEXT BOOKS (Latest editions)

1. Guyton and Hall. Text book of Medical Physiology.
2. Ganong's Review of Medical Physiology.
3. Vander's Human Physiology.
4. Berne and Levy Physiology. BM Koeppen, BA Stanton
5. Human Physiology. Lauralee Sherwood.
6. Text book of medical physiology. G K Pal.
7. Principles of Medical Physiology. Sabyasachi Sircar
8. Text book of Medical Physiology. Indu Khurana
9. Text book of Medical Physiology. D Venkatesh, H H Sudhakar
10. Essentials of Medical Physiology. ABS Mahapatra

Reference books for practical

1. McLeod's Clinical Examination
2. Hutchison's Clinical Methods.
3. Text book of practical physiology. GK Pal and Pravati Pal
4. A textbook of Practical Physiology. CL Ghai



Curriculum for Microbiology 2022



**Ramaiah Medical College
Ramaiah University of Applied Sciences
Bengaluru-560054**

DEPARTMENT OF MICROBIOLOGY

Curriculum

Introduction to Department:

Medical Microbiology is a branch of medical science that deals with causative agents of infectious diseases. These agents are generally categorized as bacteria, viruses, fungi and parasites. The interaction of various microbial agents with humans, the modes of transmission and the process of causing human infections is learnt in this course. A knowledge of these agents is essential for the comprehension of diagnostic modalities used in identification of infections and prescribe appropriate antimicrobial agents. The subject also deals with the strategies for preventing infections. Hence, a detailed microbiology curriculum is required as a foundation upon which the diagnosis of human infections can be done during clinical practice.

Medical Microbiology course will be taught in 2nd professional year of MBBS. The total duration is 11 months which is divided in 3 blocks each lasting for 3 to 4 months. The student is required to attend all the 3 blocks with active participation in all the assignments and appear for regular assessments during the entire course.

The Department of Microbiology with experienced and competent faculty enable the learning of the students through a robust activity-based curriculum. The infrastructure of the department is adequate with 1 practical hall which has the capacity to accommodate 100 students, 2 seminar halls with a capacity of 75 seats. The practical lab is designed for individual activity and is equipped with binocular self-illuminating microscopes for 75 students along with 2 LED television monitors for demonstration of procedures and microscopic pictures. The microbiology museum is a part of the Central museum to promote integrated learning activities.

The teaching faculty of Microbiology are qualified and competent. They are trained to impart quality education. The faculty have excelled in recent advances, research and innovative teaching methodology. The department also promotes student research programs to inculcate the basic research methodology concepts.

This document provides the required guidelines to implement the CBME curriculum framed by National Medical Commission (NMC) for effective teaching-learning and evaluation of students.

Goal:

The broad goal of teaching Microbiology to undergraduate students is to provide an understanding of the natural history of infectious diseases in order to deal with the etiology, pathogenesis, laboratory diagnosis, treatment and control of infections in the community.

Objectives: By the end of the course the learner will be able to:

Cognitive Domain:

1. Describe the role of microbial agents in health and disease
2. Describe the immunological mechanisms in health and disease
3. Correlate the natural history, mechanisms and clinical manifestations of infectious diseases as they relate to the properties of microbial agents
4. Describe the pathogenesis of Healthcare associated infections & the principles of infection control.
5. Select & Interpret the appropriate laboratory diagnostic tests
6. Select appropriate tests to identify antimicrobial agents that will be effective in treatment of these infections & apply suitable principles of Antimicrobial stewardship.
7. Describe measures to control and prevent infectious diseases.

Psychomotor Domain:

- t) Perform basic techniques in identification of bacterial agents causing human infections.
- u) Demonstrate the basic procedures of infection control in hospital and adhere to the standard precautions followed in the hospital
- v) Demonstrate the use of personal protective equipment
- w) Demonstrate the technique of Hand washing
- x) Interpret diagnostic tests in laboratory used to diagnose infectious diseases
- y) Demonstrate the segregation of biomedical waste generated in health care practice.
- z) Select appropriate sterilization techniques in a given situation

Affective Domain:

- h) Demonstrate humane behaviour with mutual respect for each other - personal and professional.
- i) Communicate effectively with teachers, technical staff, peers, patients during their learning activities.
- j) Develop punctuality in attending academic sessions, submissions of records and assignments.
- k) Demonstrate moral responsibility and accountability for their actions.
- l) Demonstrate honesty and integrity in all learning activities.

- m) Discuss the professional qualities of a physician of first contact and his/her responsibilities.
- n) Demonstrate respect towards all samples collected from patients during the course of their hospital visit

COURSE OUTCOMES FOR UNDERGRADUATE STUDENTS (MBBS)

STUDENT SHOULD BE ABLE TO:

Cognitive domain

1. Explain the role of microbial agents in health and disease.
2. Correlate natural history, pathogenesis, clinical manifestations, laboratory diagnosis and prophylaxis of various infections.

Psychomotor domain

3. Collect appropriate clinical specimens, perform and interpret commonly used microbiological tests for laboratory diagnosis of infectious diseases.
4. Explain the mechanisms of drug resistance in bacteria and actively participate in antibiotic stewardship programme.
5. Apply the principles of sterilization, disinfection and biomedical waste management in hospital infection control.

Affective domain

6. Demonstrate respect towards all samples collected from patients during the course of their hospital visit

Competency distribution in each block

Block 1	General Microbiology & Immunology CVS & Blood
Block 2	Gastrointestinal & hepatobiliary system Musculoskeletal system, skin and soft tissue infections

	Central Nervous System infections Respiratory tract infections
Block 3	Genitourinary & Sexually transmitted infections Zoonotic diseases & Miscellaneous

MINIMUM HOURS OF TEACHING

Competency No.	Topic	Number of competencies	LECTURE	TUTORIAL /SGD	Practical	SDL
MI1	General Microbiology & Immunology	11	16	8	15	3
MI2	CVS & Blood	7	9	9	5	1
MI3	Gastrointestinal & hepatobiliary system	8	10	4	5	0
MI4	Musculoskeletal system, skin and soft tissue infections	3	10	3	5	2
MI5	Central Nervous System infections	3	6	7	3	1
MI6	Respiratory tract infections	3	6	9	7	1
MI7	Genitourinary & Sexually transmitted infections	3	5	2	4	1
MI8	Zoonotic diseases & Miscellaneous	16	11	13	11	1
	TOTAL	54	73	55	55	10
	CBME Requirement		70	110		10

Teaching Learning Methods:

The university incorporates the guidelines of the CBME curriculum prescribed by the National Medical Commission (NMC). The department uses various innovative teaching learning methods to facilitate effective student learning.

Cognitive domain:

Sl. No.	T-L Method

1	Interactive Lectures
2	Small Group Learning Tutorials Visit to hospital OPDs, Wards , Laboratory & CSSD Problem based Learning – Clinical case discussions Museum visits for integration Competitions/Seminars videos/role play/live/simulation
3	Self-Directed Learning

Psychomotor and Affective Domain

Sl. No.	T-L Method
1.	Diagnostic techniques in Microbiology Demonstrations-videos /role play/live/simulation Slide demonstrations

TOPIC – GENERAL MICROBIOLOGY & IMMUNOLOGY - MI 1.1-1.11

Sl.No	LECTURES (10)	TUTORIALS/SGD (8)	SDL (3)	PRACTICAL (15)
1	MI1.1.1 Introduction to infectious diseases and History	Microscopy - Types of microscopes, principles and applications of each	MI1.7.2 immune system	Simple stain exercise & hanging drop demonstration
2	MI1.1.2 Morphology & Physiology of Bacteria	MI1.1.2.3 Culture Media	MI1.7.3 Antigen& immunoglobulins	MI1.1.2.3 Culture media and methods (including anaerobic)
3	MI1.1.3 Introduction to virology	MI1.1.2.4 Principles of lab diagnosis of infectious diseases – identification of bacteria (including biochemical tests)	MI1.10.4 Immunodeficiency	Identification of bacteria based on Biochemical tests
4	MI1.1.4 Introduction to mycology	MI1.3 Epidemiology & pathogenesis of Infectious diseases		MI1.1.3 Demonstration of Viral Diagnostic methods - microscopy /culture/immunological/molecular

5	MI1.1.5 Introduction to parasitology	Visit to CSSD		MI1.1.4 Demonstration of Diagnostic methods used in Fungal infections - microscopy/culture/immunological/molecular
6	MI1.4.1 Sterilization & Disinfection - Physical methods	MI1.5.1 Sterilization & Disinfection, Spaulding's classification, chemical methods		MI1.1.5 Demonstration of Diagnostic methods used in parasitic infections - microscopy/culture/immunological/molecular; stool examination Exercise (1)
7	MI1.6.1 Bacterial genetics (Bacteriophage)	MI1.6.2 Principles and types of antibiotic susceptibility testing (Introduce MRSA, ESBL, MBL, VRE)		MI1.2 Gram staining (1)
8	MI1.7.1 Immunity	MI1.9 Immunological basis of vaccine & Universal Immunization Schedule		MI1.2 Gram staining (2)
9	MI1.7.4 Complement system			MI1.2 Acid fast staining (1)
10	MI1.7.5 Antigen-Antibody reactions			MI1.2 Acid fast staining (2)
11	MI1.8.1 Immune response - Humoral			MI1.2 Stool examination (2)
12	MI1.8.2 Immune response - cell mediated			MI1.5 Physical methods of sterilization - Demo

13	MI1.10.1 Hypersensitivity -1			MI1.5 Identify the most appropriate method of sterilization / disinfection in the given case scenarios. Discuss the reason for choosing the method of sterilization / disinfection.
14	MI1.10.2 Hypersensitivity - 2			MI1.6.2 Antimicrobial susceptibility testing and interpretation – Disk diffusion Demo
15	MI1.10.3 Autoimmunity			MI1.7.5 demonstration of types of Antigen Antibody reactions
16	MI1.11 Immunology of transplantation & tumour immunity			

TOPIC – CVS & BLOOD - MI 2.1-2.7

SL.NO	LECTURE-9	TUTORIALS/SGD-9	SDL-2	PRACTICAL (5)
1	MI2.1 Rheumatic fever - Microbial agent and pathogenesis, Lab diagnosis and management - Streptococcus pyogenes	MI2.4 Anaemia(1)	Diphyllobothrium latum and Mansonella	MI2.1AE Rheumatic fever - Streptococci -ASLO
2	MI2.2 Infective endocarditis	Case discussion- Hookworms,pathogenesis, clinical course,lab diagnosis, treatment and prevention	MI2.5.4 Filarial worm	MI2.3.1 AE Sepsis markers - CRP, Procalcitonin –Applied exercise
3	MI2.3.1 Septicemia	Case discussion- Malaria with complication and reinforce life cycle, Babesiosis		MI2.2 AE Infective endocarditis (Viridans Streptococci, Coagulase negative Staphylococci)

4	MI2.5 Parasites endemic to India-Classification, distribution and diseases burden	MI2.5.3 Trypanosomes		MI2.4 stool examination(3)
5	MI2.5.1 Malaria, mode of infection, pathogenesis, clinical course, labdiagnosis, treatment and prevention	MI2.5.5 Schistosomes		MI2.6 Demonstrationof blood parasites - Plasmodia, Microfilaria (smear)
6	MI2.5.2 Leishmania pathogenesis, clinical course, labdiagnosis, treatment and prevention	MI2.7.2 Opportunisticinfections - relevant toHIV/AIDS		MI2.5.2,3 Demonstrationof blood parasites - Leishmania, Trypanosomes (smear/picture
7	MI2.7.1 HIV I	MI2.7.4 NACO guidelines, strategies, pre-test counseling, post- test counseling		MI2.7.3 AE Serological diagnosis of HIV - ICT, ELISA, PCR
8	MI2.7.3 HIV 2	MI2.7.5 Modes of transmission,prevention		MI2.7.3 Pre & Posttestcounselling, Confidentiality (AETCOM -OSPE)

TOPIC: GASTROINTESTINAL & HEAPATOBILIARY SYSTEM - MI 3.1-3.8

SL.NO	LECTURES (10)	TUTORIALS/SGD(4)	SDL(0)	PRACTICAL (6)
1	MI3.1.1 Introduction to gastrointestinal infections	MI3.1.2 Diarrheagenic E.coli	MI3.1.4 Antibiotic associated diarrrohea	MI3.1.2 ,3,5 - AE -3 Diarrheagenic E.coli, cholera, food poisoning Hanging drop preparation
2	MI3.1.3 Cholera	MI3.1.5 Viral diarrhea		MI3.1.7 ,8,9 DOAP: Stool Examination (3,4,5); Demonstration – Enatamoeba, Giardia, Coccidia
3	MI3.1.6 Bacillary dysentery	MI3.1.9 Soil transmitted helminthic infections		MI3.1.6AE Bacillary dysentery

4	MI3.1.7 Parasitic dysentery E.histolytica Balantidium coli	MI 3.6 Overview of Acid peptic disorder		MI3.4AE – Lab diagnosis of Enteric fever 1st week- blood culture 2 nd week widal test
5	MI3.1.8 Parasitic Diarrhea in immunocompetent and immunocompromised			MI3.7AE Seromarkers of Hepatitis B, Hepatitis C
6	MI3.3 Enteric fever			Applied bacteriology, virology and parasitology exercises in GIT
7	MI3.5 Food poisoning			
8	MI 3.7. 1 Enterically transmitted Viral hepatitis - Hepatitis A and E			
9	MI 3.7. 2 - Hepatitis B			
10	MI 3.7. 3 Hepatitis C and D			

TOPIC: INFECTIONS OF SKIN & MUSCULOSKELETAL SYSTEM MI 4.1-4.3

SL.NO	LECTURE (10)	TUTORIAL/SGD (3)	SDL (1)	PRACTICAL (4)
1	MI4.1.1 Introduction to anaerobic infections	MI4.1.6 Actinomycosis, Nocardia	MI4.3.3a Pox virus	MI4.3.1 Gram stain exercise Gram stain of Cl.tetani Demo) Demonstration of sample collection – (collection of pus) AE 3- 1.Cellulitis (Streptococcus pyogenes), 2.Surgical site infection, 3.Burns wound infection (Pseudomonas)
2	MI4.1.2 Tetanus	MI4.3.7 Cellulitis including diabetic foot		MI4.2 AE Osteomyelitis Infective arthritis
3	MI4.1.5 Infections of Nonsporing anaerobes	MI4.3.6 Tissue nematode infections of skin and soft-tissue		MI4.3.2 ZN staining - Demonstration of slides of 1. M Leprae, preparation of Slit Skin Smear demo (video)

4	MI4.2 Bone & joint infections			MI4.3.4,5 AE Dermatophytoses & Mycetoma collection of sample KOH mount, culture, Side culture; LPCB mount
5	MI4.3 Introduction to skin and soft tissue infections			MI4.3.3 AE - Viral exanthematous fever
6	MI4.3.2 Leprosy, (Atypical mycobacteria affecting skin			
7	MI4.3.3- Herpesviruses			
8	MI4.3.3a Viral exanthematous infections			
9	MI4.3.4 Superficial mycoses			
10	MI4.3.5 Subcutaneous mycoses			

TOPIC: CENTRAL NERVOUS SYSTEM INFECTIONS-

SL.NO	LECTURES (6)	TUTORIALS/SGD (7)	SDL (2)	PRACTICAL (3)
1	MI5.1.1 Introduction to CNS infections	MI5.1.2a Pyogenic meningitis	Prevention of Polio and rabies	MI5.2.7,8 Spotter – Polio vaccine, hydatid cyst MI5.2.8 AE 1. Rabies - using Negri body slide/photograph MI5.2.12 2.- hydatid cyst, 3. Neurocysticercosis (specimen/CT scan picture) 4. cerebral malaria - peripheral smear- Pl. falciparum or ICT
2	MI5.1.2 Pyogenic meningitis	MI5.1.3 Chronic meningitis		MI5.1.8,9,10 AE. Pyogenic meningitis- Sample collection - CSF (Manequin) 1. Meningococcus, H. influenzae 2. Neonatal meningitis - Streptococcus agalctiae

3	MI5.1.5 Fungal meningitis	MI5.1.4 Aseptic meningitis - Viral causes		MI5.1.13 AE- 3.Tubercular meningitis MI5.1.16. AE 4.Cryptococcal meningitis MI5.2.11 AE – cerebral abscess - Anaerobes/ Staphylococcus/ Nocardia
4	MI5.2.1 Viral encephalitis	MI5.2.4 Slow viral infections		
5	MI5.2.2 Polio	MI5.2.5 Parasitic meningitis and encephalitis Toxoplasmosis, cerebral malaria		
6	MI5.2.3 Rabies	MI5.2.5 Parasitic meningitis and encephalitis Primary amoebic encephalitis		
7		MI5.2.6 Infectious space occupying lesions of CNS		

TOPIC: RESPIRATORY TRACT INFECTIONS

MI6.1-6.3

Sl.No	LECTURE (6)	TUTORIALS/SGD (9)	SDL (1)	PRACTICAL (7)
1	MI6.1-6.4 Introduction to URTI - normal structure & protective mechanisms, etiology, pathogenesis, general lab diagnosis, treatment	MI6.1.7&8 Community acquired pneumonia - Pneumococcus, H.influenzae	MI6.1.9 HAP- staph, Legionella	MI6.1.3 &4 AE otitis Proteus, Aspergillus
2	MI6.1.5 Diphtheria	MI6.1.6 Whooping cough and croup B.pertusis, Parainfluenza		MI6.1.5 AE-white patch in oral cavity - Albert stain,
3	MI6.1.13 Viral pneumonia - Influenza viruses (Corona)	MI6.1.12 Viral lower respiratory infections - Adeno, RSV, EBV		AE- CAP S.pneumo, H.influenzae, K.pneumoniae VAP Acinetobacter
4	MI6.1.15 Mycobacterium	MI6.1.11 Atypical Pneumonia - Mycoplasma, Chlamydia, viral		MI 6.2 AE Gram's staining - with history - otitis

	tuberculosis- class 1			media, sinusitis
5	MI6.1.16 Mycobacterium tuberculosis- class 2	Tb- lab diagnosis with diagnostic algorithm and treatment - integrated with Path, Pharmac		MI 6.3.1,2,3AE Gram's staining - sputum (pneumococcus, Klebsiella, quality of sample)
6	MI6.1.18 & 19 Fungal infections of lower respiratory tract	MI6.1.17 Atypical Mycobacteria		MI6.3.4 Acid fast staining(4)
7		MI6.1.21 Immunoprophylaxis of Respiratory infection		MI6.3.4 Acid fast staining (5)
8		MI6.1.20 General diagnosis of pulmonary parasitic infections- Lung flukes, Paragonimus		
9		MI6.1.14 Pneumonia in immunocompromised		

TOPIC: GENITOURINARY & SEXUALLY TRANSMITTED INFECTIONS (MI7.1-7.3)

Sl.No	LECTURE (5)	TUTORIALS/SGD (2)	SDL (1)	PRACTICAL (4)
1	MI 7.1 Normal anatomy & infection of Genito urinary system- pathogenesis, general lab diagnosis	MI 7.2.7 Prevention measures in STD	MI 7.2.4 Nongonococcal urethritis including mycoplasma, Ureaplasma, Chlamydia	MI 7.2.3 AE Discharge per vagina (difference between bacterial vaginosis & bacterial vaginitis), Urethral syndrome
2	MI 7.2.1 & 2.2 Pathogens causing ulcerative Lesions in the genital tract 1- Syphilis	MI 7.2.10 Congenital infections		MI 7.2.2 AE-ulcerative lesions in the external genitalia
3	MI 7.2.2 Pathogens causing ulcerative Lesions in the genital tract 2 (Haemophilus ducreyi, LGV Calymmatobacterium granulomatis, Herpes Virus)			MI 7.3 AE - UTI sample collection
4	MI 7.2.3 Pathogens causing urethral			MI 7.3.11 AE CAUTI

	discharge/ white discharge per vagina (Gonorrhoea, Candida, Trichomonas vaginalis, Bacterial vaginosis)			
5	MI 7.3 Urinary tract infections - E.coli, Klebsiella, Proteus, Enterococcus, others			

TOPIC- ZONOTIC DISEASES & MISCELLANEOUS

(MI8.1-8.16)

SL.NO	LECTURE (6)	TUTORIALS/SGD (9)	SDL (1)	PRACTICAL (11)
1	MI8.1&1.1 Introduction to zoonotic infections, Anthrax	MI8.1.2 Plague	Zoonotic TB, cat scratch disease, rat bite fever	MI 8.1.3, 4, 5 AE- PUO Brucellosis leptospirosis SEROLOGY Brucella Agg Leptospirosis Weil Felix
2	MI8.1.3 Brucellosis	MI8.1.6 Viral hemorrhagic fevers - Yellow fever, Ebola, Rotaviruses (Hanta, Arena), Lassa, Marburg		MI8.1.6 AE-Lab diagnosis of dengue, chikungunya
3	MI8.1.4 Leptospirosis, Borreliosis	MI8.1.8 Taeniasis, (Cysticercosis, partly covered in CNS) and (Hymenolepiasis)		MI8.1.8&9 Stool Examination (5)- larva of Strongyloides Demonstration of specimen Taenia adult worms, hydatid cyst & slide of hydatid cyst
4	MI8.1.5 Rickettsial infections, Other zoonoses (Nontyphoidal Salmonellosis, Prions, Zoonotic mycoses)	MI8.2 Introduction to opportunistic infections & viral opportunistic infections, candidiasis (Also covered in HIV-CVS MI2.7)		MI8.2 AE Candidiasis Mucromycosis
5	MI8.1.6 Arboviral infections- Classification, Spotted fever group, Dengue, Chikungunya, KFD, Gen Lab diagnosis; (Zika virus)	MI8.2 Opportunistic Intestinal parasitic infections - Cystisporiasis, Cryptosporidiasis, Cyclosporiasis, Microsporidiasis and Strongyloidiasis, Giardia - (covered in GIT 3.3)		MI8.7 Donning & doffing of PPE for a given situation - 1

6	MI8.1.9 Hydatidcyst disease	MI8.4 Emerginginfections and bioterrorism		MI8.7 Donning & doffing of PPE for a given situation - 2
7	MI8.2 Zygomycosis	MI8.5 Hospital Associated Infections (seminar)		MI8.7 Donning & doffing of PPE for a given situation - 3
8	MI8.3 Oncogenic viruses -HPV, HTLV (HBV, HDV,,EBV etc)	MI8.6 Biomedical waste management		MI8.6 1.How to manage bio-spill in a simulatedsetting (AETCOM) Advice a HCW with needle stick injury in complete andcorrect sequence in a simulated setting AETCOM Segregate biomedical waste as perBMW2016 rules
9	MI8.6 Antibiotic stewardship	MI8.8 Food, waterand air microbiology		MI8.9 Collection of throat swab, nasopharyngealswab peripheral venous blood for culture in simulated situation
10	MI8.6 Infection control in hospitals-Principles, components and application; surveillance - standard & transmission based precautions, HICC	MI8.9,10&11 Sample collection and transportation -(T/L opportunities - General micro/Individual systems/Together at the end as applied Micro practical classes)		MI8.9 collection of wound swab and pus samplein simulated situation Instruct samplecollection procedure (sputum, urine, stool,for culture)
11	MI8.16 National health programs oninfectious diseases -Integrated with PSM	MI8.12 Discuss with help ofcase scenarios or role plays or videos : a. Request form or container with incomplete or wrong information Lost CSF sample Contaminatedblood for culture Delayed submission of urinesample for culture e. Salivary samplefor ZN		MI8.9 skin scraping, hair clippings and nail samples) collection procedure independently in a simulated setting (covered in skin) Demonstratingrespect to patient samples -OSPE (AETCOM)

		stain		
12		MI8.14 Interaction with ICTC staff - AETCOM		
13		MI8.15 Case based discussion - reflection confidentiality- Pt identity, lab results) - AETCOM		

Assessment methods:

Formative Assessment:

The department follows the concept of continuous assessment for evaluating the students. The department of Microbiology will conduct **monthly MCQ based tests, Class tests once in 3 months and three internal assessments.**

This facilitates to give feedback to students on their learning. These tests allow regular and timely revision by the students. It also prepares the student to attend the summative examination with confidence.

Sl. No.	Assessment methods
1	Modified Long essay, Short Essay (SE),
2	Short answer questions (SAQ)
3	Multiple choice questions (MCQ)
4	Short Seminars
5	Spotters
6	Structured Discussions
7	Table viva
8	Objective Structured Practical Examination (OSPE)

Weightage for formative assessments

Sl. No.	Component	Assessment	Weightage
1	Theory	Internal Assessment	75%
		MCQ & Class test	25%

2	Practical	Internal Assessment	75%
		SGD & Professionalism	25%

Guidelines for Internal assessment:

- 5) The department will conduct three internal assessments.
- 6) The 2nd **internal assessment** to include **one short essay** on **AETCOM module 2.7**.
- 7) The **third internal assessment** will be as per university **summative examination**.
- 8) The marks obtained in the formative assessment should be displayed on the notice board within 2 weeks after conducting the tests.

Theory:

- The theory paper in 1st and 2nd internals will be conducted for 60 marks and 3rd internals will be conducted for 100 marks.
- Blue print guidelines to be followed for question paper setting.
- The distribution of marks will be as follows:
 - i. 40% of the subject questions will be based on clinical correlation and integration (LE, SE).
 - ii. 20% of the subject questions will be comprehension level of questions (SE).
 - iii. 40% of the subject questions will be of recall type. (SAQs and MCQs).
- Each **Internal assessment weightage** will be as follows:

Sl. No.	Topic	Weightage
1	General Microbiology	10%
2	Immunology	10%
3	Bacteriology	25%
4	Virology	25%
5	Mycology	10%
6	Parasitology	20%

Scheme of Internal Assessment:

Sl. No.	Type of Question	Marks (1 st & 2 nd Internals)	Marks (3 rd internals)
1	Long essay	2 X 10 = 20	2 X 10 = 20
2	Short essay	5 X 5 = 25	8 X 5 = 40
3	Short answer	5 X 3 = 15	10 X 3 = 30

4	MCQ	-----	10 X 1 = 10
Total		60 marks	100 marks

Practical:

- The 1st and 2nd practical assessments will be conducted for **60 marks** and 3rd assessment will be for 100 marks

Scheme for practical assessment:

Sl. No.	Component	Marks (1 st & 2 nd internals)	Marks (3 rd internals)
1	Spotters	10	10
2	Gram stain	10	10
3	Acid Fast stain	10	10
4	Stool examination	5	10
5	Applied exercise 1	10	15
6	Applied exercise 2	10	15
7	OSPE & AETCOM	5	10
8	Viva	-----	20
Total		60	100

The **pass criteria** in each internal assessment will be 40% separately in theory and practical. **Eligibility criteria** to take up summative examination, theory and practical cumulative should be 50%.

Regular monthly tests will be conducted in addition to the three internal assessments. These will be in the form of **SAQ test, MCQ test, SE test, Table viva, Spotter tests etc.**

LOG BOOK:

The Microbiology log book should be completed and evaluated by the faculty on a timely basis. The same to be certified by the head of the department at the end of the program before summative examination.

Eligibility for Summative Examination:

Sl. No.	Theory	Max Marks	Marks for eligibility	Practical	Max Marks	Marks for eligibility
1	Internal Assessment	30	15	Internal Assessment	30	15

2	MCQ & Class test	10	5	SGD & Professionalism	10	5
Total		40	20	Total	40	20

The eligibility is calculated by considering the internal assessment/monthly assessment and Professionalism and ethics (**average should be 40% in theory and practical separately and 50% in theory and practical combined**).

Attendance should be **80% separately** in Theory ,Practical and AETCOM classes

If a student is found not to meet the criteria of eligibility for summative examination, remedial measures in the form of improvement tests/assignments should be given. The student can be allowed to take up summative examination if the remedial measures are fulfilled.

The internal assessment will appear as a separate subheading in the marks card and not be considered for pass criteria of summative examination.

Summative Assessment:

Marks Distribution:

Sl. No.	Theory	Practical	Viva	Total
Marks	200	80	20	300

Theory: 2 papers of 100 marks each.

The portions of theory paper I:

General Microbiology, Immunology, CVS & Blood, Gastrointestinal & Hepatobiliary system, Musculoskeletal system, Skin & soft tissue infections

The portions of theory paper II:

Central Nervous system, Respiratory System, Genitourinary & sexually transmitted infections, Zoonotic diseases and Miscellaneous.

Pattern of Assessment:

Theory: Maximum marks: 200

Theory paper I &II

Sl. No.	Type of Question	Number	Marks

1	Long Essay	2 X 10	20
2	Short Essay	8 X 5	40
3	Short answer questions	10 X 3	30
4	MCQs	10 X 1	10
5	Total	30	100

Marks Distribution for the various topics in Paper I

Topics	LE	SN	SA	Marks
General microbiology		2	1	13
Immunology		2	2	16
CVS & Blood	1 (only if no LE from Skin)	1 OR 3 (if LE is from skin)	2	21
GIT& hepatobiliary	1	2	3	29
Skin & soft tissue	1(only if no LE from CVS)	1 OR 3 (if LE is from CVS)	2	21
Total	2	10	10	100

Marks Distribution for the various topics in Paper II

Topics	LE	SN	SA	Marks
CNS	1(if not from genitourinary)	1 or 3(if MQ from genitourinary)	2	21
Respiratorysystem	1 (only if no LE from zoonotic)	2 OR 4 (if LE is from zoonotic)	2	26
Genito Urinary Tract	1(only if no LE from CNS)	1 or 3(if LE from CNS)	2	21
Zoonotic	1(only if no LE from RS)	1 OR 3(if LE is from RS)	2	21
Miscellaneous	-	1	2	11
Total	2	10	10	100

Practical: Maximum marks: 80

Sl. No.	Component	Marks
1	Spotters	10
2	Gram stain	10
3	Acid Fast stain	10
4	Stool examination	10
5	Applied exercise 1	15
6	Applied exercise 2	15
7	OSPE & AETCOM	10

Total	80

Viva: Maximum marks: 20

Sl. No.	Viva Section	Marks
1	General Microbiology & Immunology	05
2	CVS, Blood, GI & Hepatobiliary	05
3	Musculoskeletal, CNS, RS	05
4	Genito urinary, Zoonosis, Miscellaneous	05
Total		20

Pass Criteria:

The student should secure **40% in each theory paper** and **50% of aggregate of the two papers**.

The student should secure 50% in **practical exam + viva**.

Supplementary Exam:

Supplementary exams to be conducted and results to be declared **within 60** days after announcement of results of main summative examination.

Blue Print for Paper I

Sl. No.	Question	System	Bacteria	Virus	Fungi	Parasite
1	L E 1	CVS & Blood				
2	L E 2	GIT & Hepatobiliary				
3	SE 1	General Microbiology				
4	SE 2	General Microbiology				
5	SE 3	Immunology				
6	SE 4	Immunology				
7	SE 5	CVS & Blood				
8	SE 6	GIT & Hepatobiliary				
9	SE 7	Skin & Soft tissue infection				
10	SE 8	Skin & Soft tissue infection				
11	SAQ 1	General Microbiology				
12	SAQ 2	Immunology				
13	SAQ 3	Immunology				
14	SAQ 4	CVS & Blood				
15	SAQ 5	CVS & Blood				
16	SAQ 6	GIT & Hepatobiliary				
17	SAQ 7	GIT & Hepatobiliary				
18	SAQ 8	GIT & Hepatobiliary				
19	SAQ 9	Skin & Soft tissue infection				
20	SAQ 10	Skin & Soft tissue infection				
21	MCQ 1	General Microbiology				
22	MCQ 2	Immunology				
23	MCQ 3	Immunology				
24	MCQ 4	CVS & Blood				
25	MCQ 5	CVS & Blood				
26	MCQ 6	GIT & Hepatobiliary				
27	MCQ 7	GIT & Hepatobiliary				
28	MCQ 8	GIT & Hepatobiliary				
29	MCQ 9	Skin & Soft tissue infection				
30	MCQ 10	Skin & Soft tissue infection				

Blue Print for Paper II

Sl. No.	Question	System	Bacteria	Virus	Fungi	Parasite

1	LE 1	CNS				
2	LE 2	RS				
3	SE 1	RS				
4	SE 2	RS				
5	SE 3	Zoonotic infections				
6	SE 4	Miscellaneous				
7	SE 5	Genitourinary				
8	SE 6	Genitourinary				
9	SE 7	Genitourinary				
10	SE 8	CNS				
11	SAQ 1	RS				
12	SAQ 2	Zoonotic infections				
13	SAQ 3	Miscellaneous				
14	SAQ 4	Genitourinary				
15	SAQ 5	CNS				
16	SAQ 6	RS				
17	SAQ 7	Zoonotic infections				
18	SAQ 8	Miscellaneous				
19	SAQ 9	Genitourinary				
20	SAQ 10	CNS				
21	MCQ 1	RS				
22	MCQ 2	Zoonotic infections				
23	MCQ 3	Miscellaneous				
24	MCQ 4	Genitourinary				
25	MCQ 5	CNS				
26	MCQ 6	RS				
27	MCQ 7	Zoonotic infections				
28	MCQ 8	Miscellaneous				
29	MCQ 9	Genitourinary				
30	MCQ 10	CNS				

PRACTICAL PORTIONS

SL.NO	BACTERIOLOGY (One of the following)
1	STAPHYLOCOCCI IN PUS
2	STREPTOCOCCI

3	C. DIPHTHERIAE (ALBERT'S STAIN)
4	NEISSERIA GONORRHOEA (GONOCOCCI)
5	ANAEROBIC SPORE BEARER (CL.TETANI)
6	PNEUMOCOCCI (GRAM'S STAINING)
7	M. TUBERCULOSIS (ZN STAIN)
8	M.LEPRAE (ZN STAIN)
9	B. ANTHRACIS
PARASITOLOGY (One of the following)	
1	MICROFILARIA
2	HYDATID SAND
3	MALARIAL PARASITE - GAMETOCYTES
4	MALARIAL PARASITE-RING FORMS
5	ENTEROBIUS VERMICULARIS
6	TOXOPLASMA GONDII
7	EGG OF TAPEWORM
8	TENIA SOLIUM (SCOLEX)
9	LARVA OF STRONGYLOIDES
MYCOLOGY (One of the following)	
1	CANDIDA
2	ASPERRGILLUS-L.P.MOUNT
3	RHIZOPUS-L.P.MOUNT
4	RHINOSPORIDIUM
5	CRYPTOCOCCUS
6	PENCILLIUM-L.P.MOUNT
7	DERMATOPHYTE
VIROLOGY(One of the following)	
1	MOLLUSCUM CONTAGIOSUM
2	NEGRI BODIES

3	POLIO VACCINE (VIAL)
MEDIA Without Growth (One of the following)	
1	BLOOD CULTURE BROTH
2	RCM(ROBERTSON'S COOKED MEAT MEDIUM)
3	B.G.S. (BUFFERED GLYCEROL SALINE)
4	THIOGLYCOLLATE MEDIUM
5	NUTRIENT AGAR
6	BLOOD AGAR
7	CHOCOLATE AGAR
8	THIOSULPHATE CITRATE BILE SALT SUCROSE AGAR (TCBS)
9	LOWENSTEIN JENSEN MEDIUM (L.J)
10	LOEFFLER'S SERUM SLOPE
11	CITRATE MEDIUM
12	CHRISTENSEN'S UREASE MEDIUM
MEDIA With Growth (Two of the following)	
1	STAPHYLOCOCCUS ON MILK AGAR
2	P.T.A. WITH C. DIPHTHERIAE
3	MAC CONKEY AGAR WITH LACTOSE & NON LACTOSE FERMENTING COLONIES
4	WILSON AND BLAIR AGAR WITH SALMONELLA TYPHI
5	MUELLER HINTON AGAR WITH ANTIBIOTIC SENSITIVITY
6	SUGAR MEDIUM WITH ACID ONLY
7	SUGAR MEDIUM WITH ACID AND GAS
8	INDOLE POSITIVE REACTION
9	CITRATE POSITIVE REACTION
10	UREASE POSITIVE REACTION
INSTRUMENTS (One of the following)	
1	CANDLE FILTER
2	MAC INTOSH FILDES JAR

3	VDRL SLIDE
4	STERILE SWAB
5	TUBERCULIN SYRINGE
6	MICROTITRE PLATE
7	INOCULATION LOOP
8	MICRO PIPETTE
LIST OF SPECIMENS (Two of the following)	
1	ROUND WORM
2	HOOK WORM
3	WHIP WORM
5	TAPE WORM
6	HYDATID CYST - CAM
7	EMBRYONATED EGG - CAM
8	SUCKLING MOUSE

Applied exercises for CBME Batch

1. Rheumatic fever - Streptococci-ASLO
2. Sepsis markers - CRP, Procalcitonin
3. Infective endocarditis- (Viridans Streptococci, Coagulase negative Staphylococci)
4. Serological diagnosis of HIV - ICT, ELISA, PCR
5. Diarrheagenic E.coli, cholera, food poisoning
6. Bacillary dysentery
7. Lab diagnosis of Enteric fever 1st week- blood culture 2nd week widal test
8. Seromarkers of Hepatitis B, Hepatitis C
9. Cellulitis (Streptococcus pyogenes),
10. Surgical site infection,
11. Burns wound infection (Pseudomonas)
12. Osteomyelitis
13. Infective arthritis
14. Dermatophytoses
15. Mycetoma
16. Viral exanthematous fever
17. Pyogenic meningitis- Sample collection - CSF Meningococcus, H.influenzae
18. Neonatal meningitis -Streptococcus agalactiae

19. Tubercular meningitis
20. Cryptococcal meningitis
21. Cerebral abscess -Anaerobes/ Staphylococcus/ Nocardia/
22. Rabies - using Negri body slide/photograph
23. Hydatid cyst,
24. Neurocysticercosis (specimen/CT scan picture)
25. Cerebral malaria - peripheral smear- Pl.falciparum or ICT
26. Otitis media/externa- Proteus, Aspergillus
27. Gram's staining - sputum (pneumococcus, Klebsiella, quality of sample)
28. White patch in oral cavity - Albert stain
29. CAP--S.pneumoniae, H.influenzae, K.pneumoniae
30. VAP--Acinetobacter
31. Gram's staining - with history - otitis media, sinusitis
32. Discharge per vagina (difference between bacterial vaginosis & bacterial vaginitis)
33. Ulcerative lesions in the external genitalia
34. UTI--sample collection
35. CAUTI
36. PUO Brucellosis leptospirosis SEROLOGY Brucella Agg Leptospirosis Weil Felix.
37. Lab diagnosis of dengue, chikungunya

RECOMMENDED LIST OF TEXTBOOKS:

LIST OF BOOKS

1. Apurba Sastry and Sandhya Bhat; Essentials of Medical Microbiology, 3rd Edition, 2021
2. Lippincott Illustrated Reviews Microbiology, South Asian Edition by Cynthia Nau Cornelissen
 , Marcia Metzgar Hobbs SAE editors Sumathi Muralidharan & Rohith Chawla As per CBME
3. Ananthnaryan & Panikar's Text Book of Microbiology 11th Edition. edited by Reba Kanungo
4. Basic Medical Microbiology Patric R Murray
5. Roitt's Essential Immunology Peter J , Delves Seamus J. Martin Dennis R Burton Ivan M Roitt
6. Apurba Sastry and Sandhya Bhat; Essentials of Practical Microbiology, 3rd Edition, 2021
7. K D Chatterjee Parasitology Protozoology and Helminthology 13th edition 2019
8. C K Jayaram Panicker Panicker's text Book of Medical Parasitology 8th edition
9. Text book of Medical parasitology by Subhash Chandra Parija

REFERENCE BOOKS

1. Apurba Sastry and Sandhya Bhat; Essentials of hospital infection control 1st Edition, 2019
2. Mandell, Douglas, and Bennett's Principles and practice of Infectious diseases
3. Harrison's principles of internal Medicine
4. Essentials of clinical infectious diseases William F Wright

APIC .text book of Infection Control and Epidemiolog

FORMAT FOR ASSESSING PROFESSIONALISM

Sl. No.(Block)	Overall attendance (5)	Timely submission of record books /assignments (5)	Completes the record book well (5)	Behaves respectfully with peers and teachers (5)
1				
2				
3				

Signature of Faculty mentor

Signature of HOD

Guidelines for assessment:

Attendance

Grade	Percentage
5	95-100%
4	90-94%
3	85-89%
2	80-84%
1	< 80%

Submission of record books /assignments

Grade	Criteria
5	Always submits the record/assignments on time
4	Often submits the record/assignments on time
3	Frequently submits the record/assignments on time
2	Rarely submits the record on time
1	Has not submitted at all

Behaves respectfully with peers and teacher

Grade	Criteria
5	Demonstrates appropriate respectful behavior with peers and teachers always

4	Demonstrates appropriate respectful behavior with peers and teachers most of the time
3	Demonstrates appropriate respectful behavior with peers and teachers frequently
2	Demonstrates appropriate respectful behavior with peers and teachers rarely
1	Is arrogant and disrespectful to peers and teacher

Completion the record book well

Grade	Criteria
5	Diagrams are neatly drawn with complete labelling
4	Diagrams are of above average quality with nearly complete labelling
3	Diagrams are of average quality with partial labelling
2	Rarely submits the record on time
1	Diagrams are of below average quality with inadequate labelling

Format for assessing participation in SGD sessions

Name of the Student:

Date:

SGD session

5-Strongly agree 4-Agree 3 Not sure 2 Disagree 1-Strongly disagree

Sl. No.	Criteria for assessment	5	4	3	2	1
1	Critical Appraisal					
a	Clarifies, defines and analyses the problem from the scenario / interaction with patient					
b	Identifies learning objectives					
c	Demonstrates initiative and curiosity					
2	Utilization of learning resources					
a	Utilizes relevant resource materials effectively					
b	Applies knowledge to new situations to solve problems and to reach decisions					
3	Group work					
a	Organized and prepared for small group sessions					
b	Shares thoughts and opinions with peers actively					
4	Attitudes and Communication Skills					
a	The oral expression is clear enough to be understood					
b	Provides and accepts constructive feedback					
c	Contributes to group harmony (listens to conflicting opinions and tolerates shortcomings of others)					

SYLLABUS

Sl. No.	Competency number	Competency
GENERAL BACTERIOLOGY & IMMUNOLOGY (MI1.1-1.11)		
1	MI1.1	Describe the different causative agents of Infectious diseases, the methods used in their detection, and discuss the role of microbes in health and disease MI1.1.1Introduction to Infectious diseases Define: Health, Disease, infectious agents, commensalism, parasite, pathogen and opportunistic pathogen. • Classify types of infections, Describe chain of infection • Enumerate various types of medically important micro-organisms - bacteria,

		viruses, parasites, fungi • Differentiate between pathogen, commensals, and saprophyte
2	MI1.1.2	Isolation & identification of bacteria
3	MI1.1.2.1	Describe the classification & morphology of bacteria.
4	MI1.1.2.2	Describe general pathogenesis and general lab diagnosis of bacterial infections
5	MI1.1.2.3	Define, classify culture media, applications of culture media List out and describe different culture methods
6	MI1.1.2.4	Interpretation of various biochemical reactions
7	MI1.1.3	Introduction to virology • Describe the classification & morphology of virus • Describe general pathogenesis and general lab diagnosis of viral infections
8	MI1.1.4	Introduction to mycology Describe the classification & morphology of fungi .Describe general pathogenesis and general lab diagnosis of fungal infections.
9	MI1.1.5	Introduction to parasitology Describe the classification, morphology of parasites. • Describe general pathogenesis and general lab diagnosis of parasitic infections
10	MI1.2	Perform and identify the different causative agents of Infectious diseases by Gram Stain, ZN stain and stool routine microscopy
11	MI1.3	Describe the epidemiological basis of common infectious diseases Define: Epidemiology, Describe the various epidemiological patterns of infectious disease. • Discuss the various microbial factors contributing to disease. • Discuss the various sources and reservoirs of infections. • Describe the various modes of transmission of infections.
12	MI1.4	Classify and describe the different methods of sterilization and disinfection . Discuss the application of the different methods in the laboratory, in clinical and surgical practice
13	MI1.1.5	Introduction to parasitology • Describe the classification, morphology of parasites.

		● Describe general pathogenesis and general lab diagnosis of parasitic infections
14	MI1.2	Perform and identify the different causative agents of Infectious diseases by Gram Stain, ZN stain and stool routine microscopy
15	MI1.3	Describe the epidemiological basis of common infectious diseases ● Define: Epidemiology, Describe the various epidemiological patterns of infectious disease. ● Discuss the various microbial factors contributing to disease. ● Discuss the various sources and reservoirs of infections. ● Describe the various modes of transmission of infections.
16	MI1.4	Classify and describe the different methods of sterilization and disinfection. Discuss the application of the different methods in the laboratory, in clinical and surgical practice
17	MI1.4.1	Define: Sterilization, disinfection, asepsis, antiseptics, and decontamination. ● Classify & describe various methods of sterilization methods ● Discuss various methods of disinfection ● List out Testing of disinfectants. Discuss the application of the different methods in clinical and surgical practice.
18	MI1.5	Choose the most appropriate method of sterilization and disinfection to be used in specific situations in the laboratory, in clinical and surgical practice
19	MI1.5.1	Classify the medical devices using Spaulding's classification ● Classify disinfectants ● Define & applications of Fumigation, fogging ● Describe: Plasma sterilization ● Identify the most appropriate method of sterilization / disinfection in the given cases scenario.
20	MI1.6	Describe the mechanisms of drug resistance , and the methods of antimicrobial susceptibility testing and monitoring of antimicrobial therapy
21	MI1.6.1	Describe the bacterial genetic structures ● Describe bacterial variation – mutation & gene transfer ● Describe the methods of gene transfer in bacteria ● Describe gene transfer by artificial methods. ● List out mechanism of action of antimicrobial agents
22	MI1.6.2	Define drug resistance, List out various mechanisms of antibacterial resistance. MRSA,VRE,ESBL,MBL etc

		• Define: Bacteriostatic, bactericidal, pharmacodynamics, pharmacokinetics, adverse reactions. • List out and describe different methods of antimicrobial susceptibility testing • Discuss MIC, broth dilution, agar dilution • Describe principles of antibiotics selection and monitoring therapy
23	MI1.7	Describe the immunological mechanisms in health
24	MI1.7.1	Immunity • Define & classify Immunity. Describe in detail all types of Immunity. • Describe the role of vaccines in Immunity
25	MI1.7.2	Immune system - Describe structure and functions of immune system
26	MI1.7.3	Antigen & Immunoglobulins • Define & classify Antigen. Describe characteristics of Antigens • Define & classify Immunoglobulins • (Antibody). • Describe in detail all types of Antibody.
27	MI1.7.4	Complement system • Describe components, general properties cascade and role of Complement system in health and disease
28	MI1.7.5	Antigen antibody reactions • Define & classify antigen antibody reactions • Discuss the principles of Ag -Ab reactions • Describe the applications of Ag-Ab reactions in the diagnosis of diseases. • Describe the approach to interpretation of Ag-Ab reaction in the diagnosis of diseases.
29	MI1.8	Describe the mechanisms of immunity and response of the host immune system to infections
30	MI1.8.1	Define & classify Immune response • Describe humoral immune response – Primary response, Secondary response, Td response, T independent response, immunomodulators, monoclonal antibodies
31	MI1.8.2	Describe cell mediated immune response • cytokines, importance of CMI • Differentiate humoral and cell mediated immune response

		• Discuss the theories of immune response of humoral immunity
32	MI1.9	Discuss the immunological basis of vaccines and describe the Universal Immunisation schedule • Classify & describe types of immunization • Define & classify types of Vaccines • Discuss advantages and disadvantages among different types of vaccines • Describe National Immunization Schedule (India) • Importance of passive immunization
33	MI1.10	Describe the immunological mechanisms in immunological disorder (hypersensitivity, autoimmune disorders and immunodeficiency states) and discuss the laboratory methods used in detection.
34	MI1.10.1	Hypersensitivity • Define & classify Hypersensitivity reactions including Gel and Coombs classification • Describe the mechanism, clinical features, laboratory evaluation and prevention of type I hypersensitivity • Describe the mechanism, clinical features, laboratory evaluation and prevention of type II hypersensitivity • Describe the mechanism, clinical features, laboratory evaluation and prevention of type III hypersensitivity • Describe the mechanism, clinical features, laboratory evaluation and prevention of type IV hypersensitivity • Discuss tuberculin test, patch test.
35	MI1.10.2	Autoimmunity • Define & Describe mechanisms of Immunological tolerance • Define & Describe various mechanisms of autoimmunity • Describe various clinical manifestations of common autoimmune diseases • Describe approach for laboratory diagnosis of autoimmune diseases
36	MI1.10.3	Immunodeficiency • Define & Classify immunodeficiency syndromes • Describe various immunodeficiency syndromes. • Discuss the laboratory methods used in detection of immunodeficiency diseases.
37	MI1.11	Describe the immunological mechanisms of transplantation and tumor immunity

		Transplantation immunity • Define & Classify transplantation, • Define & Discuss the mechanism allograft rejection, prevention of rejection • Histocompatibility antigens, MHC, • Describe types of HLA typing • Describe Graft – versus-host reaction Tumor immunity • Define Tumor antigen, immunological surveillance • Describe immunosuppression. • Describe immunotherapy in cancer
TOPIC – CVS & BLOOD(MI2.1-2.7)		
38	MI2.1	Describe the etiologic agents in rheumatic fever and their diagnosis Rheumatic fever • Describe the immunological basis of rheumatic fever/ nonsuppurative diseases caused by streptococci • Classify streptococcus • Describe the morphology, pathogenesis, antigenic structures, toxin & virulence factors, clinical features, epidemiology of streptococcus pyogenes • Discuss the serological test for diagnosis of rheumatic fever. • Discuss the role of antibiotics in treatment and prevention of rheumatic fever.
39	MI2.2	Describe the classification etio-pathogenesis, clinical features and discuss the diagnostic modalities of Infective endocarditis • Enumerate the organisms causing infective endocarditis • Viridans Streptococcus, Coagulase negative Staph, HACEK group etc • Describe the pathogenesis, clinical features of infective endocarditis. • Discuss the approach to identify the causative organism. • Discuss the importance of multiple sample collection. • Discuss automated blood culture systems.
40	MI2.3	Identify the microbial agents causing Rheumatic Heart Disease & infective Endocarditis • Identify bacteria by observing colony morphology, biochemical reactions • Interpret antimicrobial susceptibility test. • Define: Minimum Inhibitory concentration, minimum bactericidal concentration. • Discuss other test that can be used for diagnosis.
41	MI2.3.1	Define sepsis, septicemia, bacteremia, fungemia, viremia, parasitemia • Describe etiology, pathogenesis, clinical features, lab diagnosis including prognostic markers and treatment of septicemia

42	MI2.4	List the common microbial agents causing anemia. Describe the morphology, mode of infection and discuss the pathogenesis, clinical course, diagnosis and prevention and treatment of the common microbial agents causing Anemia • List the common microbial agents causing anemia. • Describe the morphology, of the common microbial agents causing anemia. • Discuss the mode of infection, pathogenesis & clinical course of the common microbial agents causing anemia. • Discuss the laboratory diagnosis of the common microbial agents Causing anemia • Discuss the treatment & prevention of the common microbial agents causing anemia. • Infectious agents causing Iron deficiency, megaloblastic, haemolytic anaemia and anaemia of chronic infections,
43	MI2.5	Describe the etio- pathogenesis and discuss the clinical evolution and the laboratory diagnosis of kalaazar, malaria, filariasis and other common parasites prevalent in India Introduction • Classify parasites and enumerate parasites prevalent to India
44	MI2.5.1	Malaria • Describe the morphology, life cycle, pathogenesis, clinical features of malarial parasite. • Describe the treatment and prevention of malaria.
45	MI2.5.2	Leishmania • Describe the morphology, life cycle, pathogenesis, clinical features of leishmania. • Describe the laboratory diagnosis for kalaazar • Describe the treatment and prevention for kalaazar
46	MI2.5.3	Trypanosoma • Describe the morphology, life cycle, pathogenesis, clinical features of Trypanosoma. • Describe the laboratory diagnosis for sleeping sickness. • Describe the treatment and prevention for sleeping sickness
47	MI2.5.4	Filarial worm • Describe the morphology, life cycle, pathogenesis, clinical features of filarial worm. • Describe the laboratory diagnosis for filarial worm.

		• Describe the treatment and prevention for filarial worm.
48	MI2.5.5	Schistosomes • Describe the morphology, life cycle, pathogenesis, clinical features of Schistosomes. • Describe the laboratory diagnosis for schistosomiasis. • Describe the treatment and prevention of schistosomiasis.
49	MI2.6	Identify the causative agent of malaria and filariasis
50	MI2.7.1	Describe morphology, epidemiology, pathogenesis of HIV • Describe clinical features of AIDS
51	MI2.7.2	Opportunistic infections in AIDS
52	MI2.7.3	Describe the immunological abnormalities in HIV infection • Describe various methods of laboratory diagnosis of HIV • Discuss applications of serological tests. • Discuss laboratory monitoring of HIV infection • Discuss the different approaches to the treatment of AIDS
53	MI2.7.4	Discuss NACO guidelines, strategies, pre-test counseling, post- test counseling • Discuss NACO guidelines for post-exposure prophylaxis
54	MI2.7.5	Describe various modes of transmission of HIV
55	MI2.7.6	Describe prophylactic measures in preventing HIV Transmission Standard precautions, spill management etc
TOPIC: GASTROINTESTINAL & HEPATOBILIARY SYSTEM(MI3.1-3.8)		
56	MI3.1.	Enumerate the microbial agents causing diarrhea and dysentery. Describe the epidemiology, morphology, pathogenesis, clinical features and diagnostic modalities of these agents.
57	MI3.1.1-	Introduction of gastrointestinal infections • Brief structure and immunity of GIT • Define diarrhoea, dysentery • Enumerate the various etiological agents of diarrhoea bacterial, viral ,parasitic etc. • Classify the etiological agents in different age groups, immunocompromised, immunocompetent individuals. • Discuss the mode of transmission, the pathogenesis, clinical manifestation and laboratory diagnosis of diarrhoea.

58	MI3.1.2	Epidemiology, pathogenesis, laboratory diagnosis of diarrheagenic E.coli,
59	MI3.1.3	Epidemiology, pathogenesis, clinical features, complications, laboratory diagnosis, treatment & prophylaxis of Cholera
60	MI3.1.4	Antibiotic Associated Diarrhoea - Clostridium difficile
61	MI3.1.5	Viral gastroenteritis etiological agents, epidemiology, pathogenesis, clinical features and laboratory diagnosis - Rota, Astro, Noro
65	MI3.1.6	Bacillary dysentery Define dysentery etiological agents, pathogenesis, clinical features and laboratory diagnosis of bacillary dysentery - Shigella.Y.enterocolitica
66	MI3.1.7	Amoebic dysentery Discuss the morphology, life cycle, mode of transmission, pathogenesis, clinical features, complications and laboratory diagnosis of Amoebic dysentery difference between amoebic and bacillary dysentery - E.histolytica • Define mention briefly about non pathogenic intestinal amoebae
67	MI3.1.8	Etiological agents, pathogenesis, clinical manifestations and laboratory diagnosis of Diarrhoea in immunocompromised host- Giardiasis Cryptosporidium, Cyclospora, Isospora, Giardia
68	MI3.1.9	Soil transmitted helminthic infections- Ascaris, Enterobius, Trichuris trichiura
69	MI3.2	Identify the common microbial agents causing diarrhoea and dysentery
70	MI3.3	Enteric fever Describe the enteric fever pathogens and discuss the evaluation of clinical course and the laboratory diagnosis of diseases caused by them • Define, mention the etiological agents, epidemiology, pathogenesis, clinical manifestations, complications, laboratory diagnosis of enteric fever
71	MI3.4	Identify the different modalities for diagnosis of Enteric fever , choose the appropriate test related to the duration of illness .
72	MI3.5	Food poisoning Enumerate the causative agents of food poisoning and discuss the pathogenesis ,clinical course and laboratory diagnosis • Definition, source, pathogenesis, classification of food poisoning etiological agents based on type of food and pathogenesis, clinical manifestation laboratory diagnosis treatment and prophylaxis of food poisoning – Staphylococcus, Bacillus cereus, Clostridium perfringens, Clostridium botulinum, Salmonella typhimurium, halophilic vibrios etc
73	MI 3.6	Acid Peptic disease Describe the etiopathogenesis of Acid peptic disease and the clinical course . Discuss the diagnosis and management of the causative agent of Acid peptic disease .

		• Etiopathogenesis, clinical features, complications laboratory diagnosis treatment and prophylaxis of Acid peptic disease - H.pylori
74	MI3.7	Viral hepatitis Describe the epidemiology, the etio- pathogenesis and discuss the viral markers in the evolution of viral hepatitis. Discuss the modalities in the diagnosis and prevention of viral hepatitis
75	MI 3.7.1	Discuss the pathogenesis, clinical manifestations, complications and laboratory diagnosis, treatment and prophylaxis of enterically transmitted viral hepatitis Hepatitis A & E
76	MI 3.7. 2	Discuss the pathogenesis, clinical features, laboratory diagnosis treatment and prophylaxis of parenteral transmitted viral hepatitis -Hepatitis B
77	MI 3.7. 3	Discuss the pathogenesis, clinical features, laboratory diagnosis treatment and prophylaxis of parenteral transmitted viral hepatitis C & D • Note on national programme National Viral Hepatitis Control & Prevention Programme(NVHCP)
TOPIC: INFECTIONS OF SKIN & MUSCULOSKELETAL SYSTEM (MI4.1-4.3)		
78	MI4.1 -	Enumerate the microbial agents causing anaerobic infections. Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of anaerobic infections
79	MI4.1.1	Introduction to anaerobic infections • List the normal anaerobic flora of human body. • Enumerate and classify disease causing anaerobic bacteria with disease caused by them. • Define Anaerobiasis. Describe the types of samples and collection methods for anaerobic culture. Describe the transport of specimen and culture of clinical samples for anaerobic culture. List the antibiotics used to treat anaerobic infections • Classify Genus Clostridium. Describe the morphology of Genus Clostridium • Discuss the etiopathogenesis, clinical features, laboratory diagnosis, treatment and prophylaxis of Gas gangrene.
80	MI4.1.2	Discuss the pathogenesis, clinical features, laboratory diagnosis, treatment and prophylaxis of Tetanus .
81	MI4.1.3	Discuss the pathogenesis, clinical features, laboratory diagnosis and treatment of botulism .
82	MI4.1.4	Discuss the etiopathogenesis, clinical features, laboratory diagnosis and treatment of pseudomembranous colitis .
83	MI4.1.5	Classification, diseases, laboratory diagnosis & treatment of infections caused by non sporing anaerobes

84	MI4.1.6	Discuss the pathogenesis, clinical features, lab diagnosis, treatment and prophylaxis of Actinomycosis & nocardiosis
85	MI4.2	– Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of bone & joint infections • Classify bone & joint infections • Enumerate the microorganisms causing infections of bone & joint (infectious arthritis, osteomyelitis and orthopedic implant associated infections) • Describe the etiopathogenesis & clinical course of bone & joint infections • Discuss the laboratory diagnosis of bone & joint infections
86	MI4.3	Describe the etiopathogenesis of infections of skin and soft tissue and discuss the clinical course and the laboratory diagnosis
87	MI4.3.1	Introduction to Skin & Soft Tissue Infections • Describe the normal anatomy, innate immunity & commensals of skin • Define folliculitis, furuncle, carbuncle, macule, papule, nodule, pustule, vesicle, scales, ulcer and bulla. • List the various organisms causing skin and soft tissue infections - Bacteria, Viruses, Fungi, Parasites • Describe the pathogenesis, clinical course and laboratory diagnosis of Staphylococcus aureus • Enumerate the etiological agents and laboratory diagnosis of post- operative wound infections & burns wound infection
88	MI4.3.2	• Describe the pathogenesis, clinical course and laboratory diagnosis of Leprosy • Describe the pathogenesis, clinical course and laboratory diagnosis of Atypical mycobacterial infections
89	MI4.3.3	Enumerate viruses causing skin and soft tissue lesions . Discuss in detail Herpes viruses, pathogenesis, clinical features, laboratory diagnosis, treatment and prophylaxis
90	MI4.3.3a	MI4.3.3a Viral exanthematous infections - Measles, Rubella, (Coxsackie, Pox, HPV, Molluscum, Hand foot mouth Disease)
91	MI4.3.4	List fungi causing superficial fungal diseases . Describe their clinical features, laboratory diagnosis, treatment and prophylaxis - Tinea versicolor, piedra, tinea nigra, dermatophytoses, Mucocutaneous candidiasis
92	MI4.3.5	subcutaneous mycosis – list the fungi causing subcutaneous mycosis. Describe the clinical features, laboratory diagnosis and treatment of subcutaneous mycosis. - Sporotrichosis, Chromoblastomycoses, Rhinosporidiosis, entomophthoromycoses, mycetoma
93	MI4.3.6	Enumerate the tissue nematode parasites causing skin and soft tissue lesions with

		their clinical course and laboratory diagnosis- Filariasis, Onchocerca, Loa loa, Mansonella, Dracunculus, Trichinella and Larva migrans
94	MI4.3.7	Describe the pathogenesis, clinical course and laboratory diagnosis of Diabetic foot & cellulitis- Streptococcus & others
95	MI4.3.8	Describe the pathogenesis, clinical course and laboratory diagnosis of cutaneous Anthrax
		TOPIC: CENTRAL NERVOUS SYSTEM INFECTIONS –(MI5.1-5.3)
96	MI5.1	Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of meningitis
97	MI5.1.1	Describe normal structure of CNS and normal protective mechanisms
98	MI5.1.2	Define meningitis
99		MI5.1.3 Classify meningitis based on age group and duration affected, duration of disease and immune status
100	MI5.1.4	Enumerate the causative agents of meningitis and classify them based on age group
101	MI5.1.5.	Describe general pathogenesis and clinical features of meningitis
102	MI5.1.6.	Discuss the general approach to diagnosis of meningitis
103	MI5.1.7.	Describe pathogenesis, lab diagnosis, prevention and treatment of meningococcal meningitis
104	MI5.1.8.	Describe pathogenesis, lab diagnosis, prevention and treatment of pneumococcal meningitis
105	MI5.1.9.	Describe pathogenesis, lab diagnosis, prevention and treatment of meningitis caused by <i>Streptococcus agalactiae</i>
106	MI5.1.10.	Describe pathogenesis, lab diagnosis, prevention and treatment of meningitis caused by <i>Haemophilus influenzae</i>
107	MI5.1.11.	Describe pathogenesis, lab diagnosis, prevention and treatment of Listeria meningitis
108	MI5.1.12.	Describe pathogenesis, lab diagnosis, prevention and treatment of gram negative bacterial meningitis
109	MI5.1.13.	Describe pathogenesis, lab diagnosis, prevention and treatment of tubercular meningitis
110	MI5.1.14.	Describe pathogenesis, lab diagnosis, prevention and treatment of meningitis caused by spirochetes

111	MI5.1.15.	Describe pathogenesis, lab diagnosis, prevention and treatment of viral meningitis caused by <i>Herpes viruses, Enteroviruses, Mumpsvirus</i> , etc
112	MI5.1.16.	Describe pathogenesis, lab diagnosis, prevention and treatment of meningitis caused by fungi - <i>Cryptococcus neoformans, Candida Spp., Coccidioides, Histoplasma</i> , etc
113	MI5.2	Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of encephalitis
114	MI5.2.1.	Define: Encephalitis
115	MI5.2.2.	Classify Encephalitis
116	MI5.2.3.	Enumerate the causative agents of Encephalitis
117	MI5.2.4.	Describe general pathogenesis of encephalitis
118	MI5.2.5.	Describe the clinical presentation of Encephalitis
119	MI5.2.6.	Discuss the approach to diagnosis of viral Encephalitis
120	MI5.2.7.	Describe morphology of polio virus. Describe pathogenesis, clinical features, lab diagnosis and prevention of poliomyelitis
121	MI5.2.8.	Describe morphology of rabies virus. Describe pathogenesis, clinical features, lab diagnosis and prevention of rabies
122	MI5.2.9.	Describe etiology, pathogenesis, clinical features, lab diagnosis and prevention of slow viral infections
123	MI5.2.10.	Discuss the etiopathogenesis, clinical features and approach to diagnosis of parasitic meningitis and Encephalitis
124	MI5.2.11.	Discuss the etiopathogenesis, clinical features and approach to diagnosis of brain Abscess
125	MI5.2.12.	Discuss the etiopathogenesis, clinical features and approach to diagnosis of cystic brain lesion- neurocysticercosis, hydatid disease of brain
126	MI5.3	Identify the microbial agents causing meningitis
128	MI5.3.1.	Analyse clinical features, interpret laboratory test results provided to diagnose the clinical condition and identify the causative microorganism.
129	MI5.3.2	Describe normal ranges of common CSF parameters
130	MI5.3.3.	Interpret abnormal results of CSF analysis report provided.
131	MI5.3.4	Demonstrate CSF collection in a mannequin
		TOPIC: RESPIRATORY TRACT INFECTIONS MI6.1-6.3

132	MI6.1	Describe the etio-pathogenesis, laboratory diagnosis and prevention of Infections of upper and lower respiratory tract
133	MI6.1.1	Describe the structure respiratory system and role of immunity in respiratory system
134	MI6.1.2	Discuss the etiological agents, pathogenesis, epidemiology clinical features, complications and laboratory diagnosis of rhinitis
135	MI6.1.3	Discuss the classification, etiological agents, pathogenesis, epidemiology clinical features, complications and laboratory diagnosis of otitis
136	MI6.1.4	Discuss the etiological agents, pathogenesis, epidemiology clinical features, complications and laboratory diagnosis of sinusitis
137	MI6.1.5	Discuss the etiological agents, pathogenesis, epidemiology clinical features, complications and laboratory diagnosis of pharyngitis, tonsillitis
138	MI6.1.6	Discuss the etiological agents, pathogenesis, epidemiology clinical features, complications and laboratory diagnosis of laryngitis, bronchitis, bronchiolitis
139	MI6.1.7	Define & classify pneumonia. Enumerate the etiological agents of pneumonia general laboratory diagnosis and prophylaxis of pneumonia
140	MI6.1.8	Discuss pathogenesis, epidemiology clinical features, complications and laboratory diagnosis of community acquired pneumonia- pneumococci
141	MI6.1.9	Enumerate the etiological agents, pathogenesis, epidemiology clinical features, complications and laboratory diagnosis of hospital acquired pneumonia-Klebsiella, Staphylococci, Legionella
142	MI6.1.10	Enumerate the etiological agents, pathogenesis, epidemiology clinical features, complications and laboratory diagnosis treatment and prophylaxis of ventilator associated pneumonia- Acinetobacter
143	MI6.1.11	Enumerate the etiological agents, pathogenesis, epidemiology clinical features, complications and laboratory diagnosis of atypical pneumonia- Mycoplasma, Chlamydia
144	MI6.1.12	Enumerate the etiological agents, pathogenesis, epidemiology clinical features, complications and laboratory diagnosis of viral respiratory infections – Adeno, RSV, EBV
145	MI6.1.13	Enumerate the etiological agents, pathogenesis, epidemiology clinical features, complications and laboratory diagnosis of viral pneumonia – Influenza virus, SARS –corona
146	MI6.1.14	Enumerate the etiological agents, pathogenesis, epidemiology clinical features, complications and laboratory diagnosis of pneumonia in immunocompromised host Pneumocystis jirovecii, CMV
147	MI6.1.15	Describe the epidemiology, mode of transmission, pathogenesis, clinical features

		complications, laboratory diagnosis, treatment and prophylaxis of pulmonary tuberculosis
148	MI6.1.16	Discuss the importance of MDR TB, RNTCP HIV TB co-infection
149	MI6.1.17	Define and classify the atypical mycobacteria discuss the pathogenesis, clinical features, complications and treatment of pulmonary atypical mycobacterial infection
150	MI6.1.18	Discuss the general characters of dimorphic fungi. Discuss the mode of transmission, pathogenesis, clinical features, complications and laboratory diagnosis of pulmonary mycosis-Histoplasma, coccidioides, Blastomyces, Paracoccidioides
151	MI6.1.19	Discuss mode of transmission, pathogenesis, clinical features laboratory diagnosis of aspergillosis
152	MI6.1.20	Parasites affecting lung – Paragonimus westermanii (non core), Loefflers syndrome, amoebic lung abscess
153	MI6.1.21	Discuss the immunoprophylaxis for respiratory tract infections
154	MI6.2	Identify the common etiologic agents of upper respiratory tract infections (Gram Stain)
155	MI 6.2.1	Describe the method of sample collection and transportation
156	MI 6.2.2	Explain the steps of gram's staining procedure
157	MI 6.2.3	Do the grams staining procedure
158	MI 6.2.4	Observe the stained smear
159	MI 6.2.5	Interpret and Report the staining results
160	MI6.3	Identify the common etiologic agents of lower respiratory tract infections (Gram Stain & Acid fast stain)
161	MI 6.3.1	Enumerate the organisms causing LRTI
162	MI 6.3.2	Describe the method of sample collection
163	MI 6.3.3	Recap the Gram's staining procedure and repetition
164	MI 6.3.4	Explain the Acidfast staining procedure
165	MI 6.3.5	Perform the Acid fast staining procedure
166	MI 6.3.6	Interpret and Report the staining results
Topic: - Genitourinary & sexually transmitted infections (MI7.1-7.3)		

167	MI 7.1 -	Describe the etiopathogenesis and discuss the laboratory diagnosis of infections of genitourinary system
168	MI 7.1.1	Describe the normal anatomy and innate defense mechanisms in the male and female genital tract
169	MI 7.1.2	Enumerate the various infections of genitourinary tract
170	MI 7.1.3	Describe the etiology and pathogenesis of Genitourinary tract infections in general
171	MI 7.1.4	Discuss the clinical features, sample collection and laboratory diagnosis of genitourinary infections in general
172	MI 7.1.5	Discuss the effect/ complications of genitourinary infections in pregnancy (Maternal & fetal)
173	MI 7.2 –	Describe the etiopathogenesis and discuss the laboratory diagnosis of Sexually Transmitted Infections . Recommend preventive measures
174	MI 7.2.1	Enumerate the bacterial, viral, fungal and parasitic agents causing Sexually Transmitted infections
175	MI 7.2.2	Describe the pathogenesis, clinical features, laboratory diagnosis and treatment of pathogens causing ulcerative lesions in the genital tract (Syphilis, Haemophilus ducreyi, LGV, Calymmatobacterium granulomatis, Herpes Virus)
176	MI 7.2.3	Describe the pathogenesis, clinical features, laboratory diagnosis and treatment of pathogens causing Urethral syndrome/ white discharge per vagina (Gonococci, Candida spp, Trichomonas vaginalis, Bacterial vaginosis)
177	MI 7.2.4	Describe the pathogenesis, clinical features, laboratory diagnosis and treatment of Mycoplasma spp
178	MI 7.2.5	Describe non gonococcal urethritis. Enumerate the agents causing the same
179	MI 7.2.6	Differentiate between bacterial vaginosis & bacterial vaginitis
180	MI 7.2.7	Discuss the various measure for prevention of Sexually Transmitted infections
181	MI 7.2.8	Discuss the importance of confidentiality in reporting Sexually transmitted diseases
182	MI 7.2.9	Discuss the role of counselling in management of Sexually transmitted diseases
183	MI 7.2.10	Enumerate the pathogens causing congenital infections. Discuss the pathogenesis, lab diagnosis, prophylaxis, prevention and treatment of these infections.
184	MI 7.3 –	Describe the etiopathogenesis, clinical features, the appropriate method for specimen collection and discuss the laboratory diagnosis of Urinary tract infections

185	MI 7.3.1	Describe the normal anatomy, physiology and Innate defense mechanisms of the urinary tract
186	MI 7.3.2	Mention the types of Urinary tract infections (upper and lower)
187	MI 7.3.3	Mention the causative agents of urinary tract infection
188	MI 7.3.4	Enumerate the predisposing factors in Urinary Tract infections
189	MI 7.3.5	Discuss the pathogenesis of urinary tract infection
190	MI 7.3.6	Discuss the clinical features of Urinary tract infections (Difference between upper and lower urinary tract infections)
191	MI 7.3.7	Describe the methods of collection of urine from infant, adult men/women, and catheterized patients
192	MI 7.3.8	Discuss the concept of significant bacteriuria
193	MI 7.3.9	Discuss about asymptomatic bacteriuria & conditions these are seen
194	MI 7.3.10	Describe about sterile pyuria and enumerate the disease causing sterile pyuria
195	MI 7.3.11	Define Catheter associated urinary tract infection. Enumerate the predisposing factors, prevention, diagnosis and treatment of CAUTI
196	MI 7.3.12	Discuss the laboratory diagnosis and treatment of Urinary tract infections
		TOPIC- ZOONOTIC DISEASES & MISCELLANEOUS (MI8.1-8.16)
197	MI8.1	Enumerate the microbial agents and their vectors causing Zoonotic diseases . Describe the morphology, mode of transmission, pathogenesis and discuss the clinical course laboratory diagnosis and prevention Introduction -Define zoonotic infections. Enumerate organisms causing zoonotic infections in man and the mode of transmission/vectors transmitting them
198	MI8.1.1	Anthrax -Describe the morphology, mode of transmission, pathogenesis and discuss the clinical course laboratory diagnosis and prevention of Anthrax
199	MI8.1.2	Plague - Describe the morphology, mode of transmission, pathogenesis and discuss the clinical course laboratory diagnosis and prevention plague
200	MI8.1.3	Brucellosis -Describe the morphology, mode of transmission, pathogenesis and discuss the clinical course laboratory diagnosis and prevention brucellosis
201	MI8.1.4	Leptospirosis -Describe the morphology, mode of transmission, pathogenesis and discuss the clinical course laboratory diagnosis and prevention leptospirosis
202	MI 8.1.5	Rickettsia - Describe the morphology, mode of transmission, pathogenesis and discuss the clinical course laboratory diagnosis and prevention Rickettsial and miscellaneous zoonoses

203	MI8.1.6	Arboviral -Describe the morphology, mode of transmission, pathogenesis and discuss the clinical course laboratory diagnosis and prevention of Arboviral infections Dengue, chikungunya, KFD
204	MI8.1.7	Toxoplasma & Balantidium -Describe the morphology, mode of transmission, pathogenesis and discuss the clinical course laboratory diagnosis and prevention of toxoplasmosis & balantidiasis
205	MI1.8.8	Taeniasis -Describe the morphology, mode of transmission, pathogenesis and discuss the clinical course laboratory diagnosis and prevention of taeniasis
206	MI1.8.9	Hydatid disease -Describe the morphology, mode of transmission, pathogenesis and discuss the clinical course laboratory diagnosis and prevention of hydatid cyst disease
207	MI1.8.10	Rabies -Describe morphology of Rabies virus. Describe pathogenesis, clinical features, lab diagnosis and prevention of rabies
208	MI8.2	Describe the etio-pathogenesis of Opportunistic Infections (OI) and discuss the factors contributing to the occurrence of OI, and the laboratory diagnosis • Define opportunistic infections • Enumerate organisms causing opportunistic infections • Discuss factors contributing to development of opportunistic infections Viral agents • Describe pathogenesis, clinical features, laboratory diagnosis and prevention of viral opportunistic infections - Herpes group, human papilloma virus, Fungal OI • Describe pathogenesis, clinical features, laboratory diagnosis and prevention of candidiasis • Describe pathogenesis, clinical features, laboratory diagnosis and prevention of Cryptococcosis • Describe pathogenesis, clinical features, laboratory diagnosis and prevention of mucormycosis Parasitic OI • Describe pathogenesis, clinical features, laboratory diagnosis and prevention of opportunistic parasitic infections - coccidian intestinal parasitic infections, strongyloidiasis
209	MI8.3	Describe the role of oncogenic viruses in the evolution of virus associated malignancy • Define oncogenic viruses • Enumerate oncogenic viruses

		• Describe pathogenesis of viral oncogenesis • Describe laboratory diagnosis of oncogenic viral infections • Describe methods of prevention of oncogenic viral infections
210	MI8.4	Describe the etiologic agents of Emerging Infectious diseases. • Discuss the clinical course and diagnosis • Define emerging infectious agents. • Enumerate agents causing emerging infections • Describe factors contributing to emerging infections. • Discuss clinical course and laboratory diagnosis of emerging infections • Describe the Indian scenario of emerging infectious agents
211	MI8.5	Define Healthcare Associated Infections (HAI) and enumerate the types. Discuss the factors that contribute to the development of HAI and the methods for prevention • Define Healthcare Associated Infections (HAI) • Enumerate the types of HAI • Discuss the factors that contribute to the development of and methods to prevent catheter associated urinary tract infection (CAUTI) • Discuss the factors that contribute to the development of and methods to prevent central line associated blood stream infection (CLABSI) • Discuss the factors that contribute to the development of and methods to prevent ventilator associated pneumonia (VAP) • Discuss the factors that contribute to the development of and methods to prevent surgical site infection (SSI) • Describe principles and application of antibiotic stewardship
212	MI8.6	Describe the basics of PANDEMIC MANAGEMENT (Infection control) • Define Standard precautions • List the components of Standard precautions • Describe the various transmission-based precautions. • Describe the constitution and functions of HICC. • Define Biomedical waste • Classify biomedical waste and describe methods of segregation, decontamination and disposal of each type as per Biomedical waste management rule • Describe appropriate management of needle stick injury in healthcare setting • Manage bio-spill • Describe vaccines that are useful in healthcare workers

213	MI8.7	Demonstrate Pandemic management (Infection control) practices and use of Personal Protective Equipment (PPE)
214	MI8.8	Describe the methods used and significance of assessing the microbial contamination of food, water and air • Describe the methods used and significance of assessing the microbial contamination of food. • Describe the methods used and significance of assessing the microbial contamination of water. • Describe the methods used and significance of assessing the microbial contamination of air.
215	MI8.9	Discuss the appropriate method of collection of samples in the performance of laboratory tests in the detection of microbial agents causing Pandemic (infectious diseases) • Discuss methods of sample collection for laboratory diagnosis of upper respiratory infections • Discuss methods of sample collection for laboratory diagnosis of lower respiratory infections • Discuss methods of sample collection for laboratory diagnosis of CVS and blood stream infections • Discuss methods of sample collection for laboratory diagnosis of CNS infections • Discuss methods of sample collection for laboratory diagnosis of gastrointestinal infections • Discuss methods of sample collection for laboratory diagnosis of infections of skin and soft tissues • Discuss methods of sample collection for laboratory diagnosis of musculoskeletal infections • Discuss methods of sample collection for laboratory diagnosis of infections eye, nose and ear • Discuss methods of sample collection for laboratory diagnosis of genitourinary infections
216	MI8.10	Demonstrate the appropriate method of collection of samples in the performance of laboratory tests in the detection of microbial agents causing Pandemic (Infectious diseases)
217	MI8.11	Demonstrate respect for patient samples sent to the laboratory for performance of laboratory tests in the detection of microbial agents causing Infectious diseases
218	MI8.12	Discuss confidentiality pertaining to patient identity in laboratory results

		• Discuss the rights and responsibility of patients • Discuss the rights and responsibility of laboratory with respect to confidentiality of laboratory results • Discuss the ethical issues involved in confidentiality pertaining to patient identity. • Discuss the medicolegal consequences of breach in confidentiality
219	MI8.13	Choose the appropriate laboratory test in the diagnosis of the infectious disease • Identify the clinical condition based on the history provided. • Choose the appropriate laboratory tests in the diagnosis of given infectious disease. • Justify why a particular laboratory test was chosen to diagnose a given infectious disease
220	MI8.14	Demonstrate confidentiality pertaining to patient identity in laboratory results • Demonstrate the understanding of importance of confidentiality with respect to patient's laboratory test results • Identify situations where confidentiality needs to be maintained regarding patient's laboratory test results and where it can be bypassed • Demonstrate confidentiality pertaining to patient identity in laboratory results. • Counsel the patient about the test results in simulated setting
221	MI8.15	Choose and Interpret the results of the laboratory tests used in diagnosis of the infectious diseases • Choose appropriate laboratory test(s) in the diagnosis of the infectious disease based on the case scenario and the order in which they need to be performed, if applicable • Interpret the results of the laboratory tests used in diagnosis of the given infectious disease scenario
222	MI8.16	Describe the National Health Programs in the prevention of common infectious disease (for information purpose only as taught in CM) • Enumerate all the National Health Programs regarding common infectious diseases in India • Describe the goals of the various National Health Programs in the prevention of common infectious disease. • Describe laboratory diagnostic tools used in the National Programs related to infectious diseases • Describe general immunoprophylactic and chemoprophylactic measures used in

		the National Programs related to infectious diseases



Curriculum for Pathology 2022



**Ramaiah Medical College
Ramaiah University of
Applied Sciences
Bengaluru-560054**

DEPARTMENT OF PATHOLOGY

CURRICULUM

Introduction

The Human Pathology forms the basis of all medical sciences. It is a bridging discipline involving both basic science and clinical practice and devoted to the study of structural and functional changes in cells, tissues and organs that underlie disease. By the use of molecular, immunologic along with Cytogenetics, pathology attempts to explain the why and wherefores of the signs and symptoms manifested by patients while providing a sound foundation for rational clinical care and therapy..

The Department of Pathology has experienced and competent faculty enable the learning of the students through a robust activity-based curriculum. The department is well equipped with modern infrastructure which includes two practical halls and three demonstration rooms which is well spaced and designed for small groups of students to conduct practicals/small group teaching/tutorials and study human pathology specimens. The **pathology practical lab** is designed for individual activity and has a capacity to accommodate around 100 students. Three large TV monitors are installed for better visualization of microscopic diagrams. The lab also has adequate mounted gross specimens and slides of undergraduate topics to facilitate student learning. The pathology museum is a part of the Central museum to promote integrated learning activities and facilitate and promote individual self- learning. .

The teaching faculty of Pathology are qualified and competent in various fields including Haemato-oncology, Histopathology, Cytology, Immunofluorescence, Immunohistochemistry, etc. They are also trained under MEU to impart quality education. The faculty have excelled in recent advances, research and innovative teaching methodology. The department also promotes student research program to inculcate the basic research methodology concepts for example- ICMR (STS) projects.

This document provides the required guidelines to implement the CBME curriculum framed by National Medical Commission (NMC) for effective teaching-learning and evaluation of students.

Aim:

The broad goal of the teaching of undergraduate students in Pathology is to provide the students with a comprehensive knowledge of the mechanisms and causes of disease, in order to enable him/her to achieve complete understanding of the natural history and clinical manifestations of disease.

Course Outcomes:**Knowledge:**

1. Describe the structure and ultrastructure of a normal and diseased cell , pathogenesis of cell injury, intracellular accumulation, cell death, process of acute, chronic and granulomatous inflammation along with healing and repair.
2. Describe the concept and mechanism of immunological diseases, hypersensitivity reaction, autoimmunity, immune tolerance, transplant rejection and infectious diseases.
3. Describe etiopathogenesis, and altered morphology of various organ systems in different diseases along with their clinical significance.

Skills:

1. Collection, handling of various body fluids- blood, CSF, Urine, bone marrow and reporting.
2. Interpretations of cytopenia, cytopia including anemias, leukaemia, and platelet disorder with relevant investigations.

Attitude, Ethics and Communication (AETCOM):

1. Demonstrate respect in relationship with patients, fellow team members, superiors and other health care workers
2. Attitude and communication expertise in the above scenarios

Teaching Learning Methods:

The department uses diverse teaching learning methods to facilitate effective student learning.

Sl. No.	T-L Method	Number of Hours
1	No. of competencies	181
2	Interactive Lectures	80
3	SGD/Tutorial	79
4	DOAP	60
5	Self-Directed Learning	12
6	Integrated Teaching	09

Psychomotor and Affective Domain

Sl. No.	T-L Method	Number of Hours
1.	DOAP practicals (Demonstrations-videos/role play/live/simulation/Virtual Reality Slide demonstrations/OSPE/Gross specimen demonstration	60

AETCOM

Sl. No.	T-L Method	Number of hours
1	Interactive lectures/case discussions	06

Objectives:**Knowledge:**

At the end of the course, the student should be able to:-

1. Describe the structure and ultrastructure of a sick cell, mechanisms of cell degeneration, cell death and repair and be able to correlate structural and functional alterations.
2. Explain the pathophysiological processes which govern the maintenance of homeostasis, mechanisms of their disturbance and the morphological and clinical manifestations associated with it.
3. Describe the mechanisms and patterns of tissue response to injury such that she/he can appreciate the pathophysiology of disease processes and their clinical manifestations.
4. Correlate normal and altered morphology (gross and microscopic) of different organ systems in common diseases to the extent needed for understanding of disease processes and their clinical significance.

Skills:

At the end of the course, the student should be able to:-

1. Describe the rationale and principles of technical procedures of the diagnostic laboratory tests and interpretation of the results.
2. Perform the simple bed-side tests on blood, urine and other biological fluid samples.
3. Draw a rational scheme of investigations aimed at diagnosing and managing the cases of common disorders.
4. Understand biochemical/physiological disturbances that occur as a result of disease in collaboration with preclinical departments.

Attitude, Ethics and Communication:

At the end of the course, the student should be able to:

1. Integrate the causes of disease and relationship of different etiological factors (social, economic and environmental) and that contribute to the natural history of diseases most prevalent in India.

List of competencies

Theory:

COMPETENCY DISTRIBUTION IN EACH BLOCK

FIRST BLOCK

Sl.NO		TOPIC
LECTURES TO BE COVERED IN FIRST BLOCK		
1.	PA 1	PA1.2 Enumerate common definitions and terms used in Pathology PA1.3 Describe the history and evolution of Pathology
2.	PA 2	PA2.1 Demonstrate knowledge of the causes, mechanisms, types and effects of cell injury and their clinical significance
3.	PA 2	PA2.2 Describe the etiology of cell injury. Distinguish between reversible-irreversible injury: mechanisms; morphology of cell injury
4.	PA 2	PA2.3 Intracellular accumulation of fats, proteins, carbohydrates, pigments
5.	PA 2	PA2.4 Describe and discuss Cell death- Apoptosis and autolysis
6.	PA 2	PA2.7 Describe and discuss the mechanisms of cellular aging and apoptosis
7.	PA 4	PA4.1 Define and describe the general features of acute and chronic inflammation including stimuli, vascular events
8.	PA 4	PA4.1 Define and describe the general features of acute and chronic Inflammation including stimuli, and cellular events
9.	PA 4	PA4.2 Enumerate and describe the mediators of acute inflammation
10.	PA 4	PA4.3 Define and describe chronic inflammation including causes, types enumerate types, non-specific and granulomatous; and examples of each
11.	PA 5	PA5.1 Define and describe the process of repair and regeneration including wound healing and its types
12.	PA 6	PA6.1 Define and describe edema, its types, pathogenesis and clinical correlations
13.	PA 6	PA6.3 Define and describe shock, its pathogenesis and its stages
14.	PA 6	PA6.4 Describe the etiopathogenesis and consequences of thrombosis
15.	PA 6	PA6.5 Define and describe embolism and its causes and common types
16.	PA 7	PA7.1 Define and classify neoplasia. biologic, behaviour and spread
17.	PA 7	PA7.1 Define and classify neoplasia. biologic, behaviour and spread
18.	PA 7	PA7.2 Describe the molecular basis of cancer
19.	PA 7	PA7.2 Describe the molecular basis of cancer
20.	PA 7	PA7.3 Enumerate carcinogens and describe the process of carcinogenesis
21.	PA 7	PA7.3 Enumerate carcinogens and describe the process of carcinogenesis
22.	PA 9	PA9.3 HLA system and the immune principles. Describe the involved in transplant and mechanism of transplant rejection
23.	PA 9	PA9.4 Define autoimmunity. Enumerate autoimmune disorders
24.	PA 9	PA9.5 Define and describe the pathogenesis of Systemic Lupus Erythematosus
25.	PA 9	PA9.6 Define and describe the pathogenesis and pathology of HIV and AIDS
26.	PA 9	9.7 Define and describe the pathogenesis of other common autoimmune diseases
27.	PA 10	PA10.3 Define and describe the pathogenesis and pathology of leprosy
28.	PA 13	PA13.3 Define and classify anemia

29.	PA 13	PA13.4 Enumerate and describe the investigation of anemia

30.	PA 14	PA14.1 Describe iron metabolism PA14.2 Describe the etiology, investigations and differential diagnosis of microcytic hypochromic anemia
31.	PA 15	PA15.1 Describe the metabolism of Vitamin B12 and the etiology and pathogenesis of B12 deficiency PA15.2 Describe laboratory investigations of macrocytic anemia
		PA15.4 etiology and Written/ Viva voce General Medicine distinguishing features of megaloblastic and non-megaloblastic macrocytic anemia
32.	PA 16	PA16.1 Define and classify hemolytic anemia PA16.2 Describe the pathogenesis and clinical features and hematologic indices of hemolytic anemia PA16.5 Describe the peripheral blood picture in different hemolytic anaemias
33.	PA 16	PA16.3 Describe the pathogenesis, features, hematologic indices and peripheral blood picture of sickle cell anaemia and thalassemia
34.	PA 16	PA16.4 Describe the etiology pathogenesis, hematologic indices and peripheral blood picture of Acquired haemolytic anaemia
35.	PA 17	PA 17.1 Enumerate the etiology, pathogenesis and findings in aplastic anemia PA17.2 Enumerate the indications and describe the findings in bone marrow aspiration and biopsy
SMALL GROUP DISCUSSION TOPICS TO BE COVERED IN FIRST BLOCK		
1	PA 1.1	PA 1.1-Describe the role of a pathologist in diagnosis and management of disease
2	PA2.6	PA2.6 -Describe and discuss cellular adaptations: atrophy, Hypertrophy, hyperplasia, metaplasia, dysplasia
3	PA-3	PA 3.1-Describe the pathogenesis and pathology of amyloidosis PA 3.2-Identify and describe amyloidosis in a pathology specimen
4	PA-2	Tutorial/ Formative assessment- Cell Injury
5	PA 4	Tutorial/ Formative assessment - Inflammation
6	PA 5	Tutorial / formative assessment- Healing and repair
7	PA- 6	Tutorial/ Formative assessment – Hemodynamic Disorders
8	PA 7	PA7.4 Describe the effects of tumor on the host including paraneoplastic syndrome PA7.5 Describe immunology and the immune response to cancer
9	PA 7	Tutorial/ Formative assessment-Neoplasia.
10	PA 9.1,9.2	PA 9.1Describe the principles and mechanisms involved in immunity PA9.2 Describe the mechanism of hypersensitivity reactions
11	PA 16.4	Case based discussion of 1.Sickle cell anemia; 2. Thalassemia; 3. Hereditary spherocytosis; 4. Autoimmune hemolytic anemia
DOAP TOPICS TO BE COVERED IN FIRST BLOCK		
1	PA 2.5	Degeneration Specimens-Fatty liver Slides- Fatty liver, dystrophic calcification, hyaline degeneration
2	PA 2.8	Necrosis Specimen- Gangrene Slides- Coagulative necrosis, Caseous necrosis.
3	PA 4.4	Acute Inflammation Specimen- Acute appendicitis, Lobar

		Pneumonia Slides- Acute appendicitis, Lobar Pneumonia
4	PA 4.4	Chronic Inflammation Specimens- TB lymph node, Madura foot Slide- Granulation tissue, TB lymph node, Actinomycosis, Rhinosporidiosis
5	PA 6.2, PA 6.7	CVC and Infarction Specimen- CVC Liver (Optional). Infarction- Spleen Slide- CVC lung, CVC liver (Optional), CVC Spleen (Optional), Infarction-Spleen
6	PA 7	Benign tumors

AETCOM

Competency number	Competency
PA 2.4	“Tag along” session in hospital
PA2.4	“Tag along” session in hospital
PA 2.4	Small group discussion session

Topics for integrated teaching:

No	Topics (Competencies)	Vertical Integration	Horizontal Integration
1.	Shock (PH 1.27, PA 6.3, MI 2.3.1)	General Surgery	Pharmacology Pathology Microbiology
2.	Immunology- Hypersensitivity reactions (MI 1.10, PH 1.27, PA 9.2)	-----	Pathology Pharmacology Microbiology
3.	Anaemia (PA 14, PH 1.35, MI 2.4)	General Medicine	Pharmacology Microbiology Pathology
4.	Pulmonary Tuberculosis. (PH 1.44, PA 26.4, MI 6.1.15, 6.1.16)	Com Med	Pathology Microbiology Pharmacology
5.	Malaria (MI 2.5.1, PH 1.47, PA 10.1)	Com Med	Microbiology Pathology Pharmacology
6.	Myocardial Infarction (PA 27.5, PH 1.28)	General Medicine	Pharmacology Pathology
7.	HIV and AIDS (PH 1.48, PA 9.6, MI 2.7.1, 2.7.3)	-----	Pharmacology Pathology Microbiology
8.	Diabetes Mellitus (PA 32, PH 1.36)	General Medicine	Pharmacology Pathology
9.	Hepatitis (PH 1.48,PA 25.4,MI -3.7.1, 3.7.2, 3.7.3)	-----	Pathology Microbiology Pharmacology

Assessment methods:

Formative Assessment:

The department follows the concept of continuous assessment for evaluating the students. The department of Pathology will conduct three formative tests and three internal assessments. These tests help students to improve their academic performance and also helps them to attend the summative examination with confidence.

Sl. No.	Assessment methods
1	Long Essay Question (LEQ), Short Essay Question (SEQ)
2	Short Answer Questions (SAQ)
3	Multiple Choice Questions (MCQ)
4	Objective Structure Practical Examination (OSPE)
5	Spotters
6	Table viva / Viva - voce

Guidelines for Internal assessment

1. The department should conduct a minimum of three internal assessments. Internal assessment should be based on competencies and skills.
2. The structure of the internal assessment examinations should be preferably similar to the structure of university examinations.
3. It is mandatory for students to appear for all the internal assessment tests in order to obtain eligibility to appear for university / summative examination.
4. Internal assessment to be conducted at the end of each block.
5. Additional internal assessment examination for absent students can be considered due to genuine reason after approval by the head of the department. It should be taken before the submission of internal assessment marks to the University.
6. Theory internal assessment marks should include 10 marks from formative tests.

7. Theory internal assessment test is to be conducted for 60 marks (I & II IAT) /100 marks (III IAT) and will be reduced to 30 marks.
8. Average marks obtained in all three internal assessments for theory should be calculated to 40 marks.
9. Blue print to be prepared for question paper setting.
10. Practical internal assessment to be conducted for 40 marks which also includes 5 marks for maintaining practical record and log book.
11. The marks obtained in the formative assessment should be displayed on the notice board within two weeks after conducting the tests.
12. Feedback on internal assessment should be provided to students throughout the course so that they are aware of their performance and remedial action can be initiated well in time.
13. It is also recommended that students should sign whenever they are shown internal assessment marks in token of having seen and discussed the marks.
14. Internal assessment marks will not be added to university examination marks and will reflect as a separate head of passing at the summative examination.
15. Learners must have completed the required certifiable competencies for that phase of training and completed the log book appropriate for that phase of training to be eligible for appearing at the final university examination of that subject.
16. There should be at least one assessment based on direct observation of skills, attitudes and communication at all levels. Communication and attitudinal assessment should also be built in to all assessments as far as possible.
17. There should be at least one short question from AETCOM

18. Criteria for appearing in university examination: Students must secure at least 50 % marks of the total marks (combined in theory and practical) and not less than 40 % marks in theory and practical separately assigned for internal assessment.
19. A student who has not secured requisite aggregate in the internal assessment may be subjected to remedial assessment by the institution. If he / she successfully completes the same is eligible to appear for university examination. Remedial assessment shall be completed before submitting the internal assessment marks to the university.

Scheme of Internal Assessment:

I. Theory:

Sl. No.	Type of Question	Marks	Marks
1	Long Essay Questions	1X10= 10	2X10 = 20
2	Short Essay Questions	05X5 = 25	08X5 = 40
3	Short Answer Questions	05X3 =15	10X3 = 30
4	Multiple Choice Questions	10X1=10	10X1 = 10
	Total	60	100

Regular formative tests to be conducted in addition to the three internal assessments. These may be in the form of SAQ, MCQ, SEQ test, assignment, project, etc. These will be given weightage when considering internal assessment eligibility for summative examination.

LOG BOOK:

The log book should be completed and evaluated by the faculty on a timely basis. The same to be certified by the head of the department at the end of the programme before summative examination.

PRACTICAL RECORD:

The record should be certified before each internal assessment and final certification by the head of the department before summative examination.

Theory		Practical	
IA Theory	30	IA Practical	35
Formative Assessment	10	Record and log book	05
Total	40	Total	40

Eligibility Criteria for University Examination:

Internal Assessment: Student must secure at least 50 % marks of the total marks (combined in theory and practical) and not less than 40 % marks in theory and practical separately assigned for internal assessment.

Attendance: Student must have 75% and 80% attendance in Theory & Practicals respectively. He / she should also have 75% attendance in AETCOM.

If a student is found not to meet the criteria of eligibility for summative examination, remedial measures in the form of remedial classes/ improvement tests/assignments should be given. The student can be allowed to take up summative examination if the remedial measures are fulfilled.

Note: The internal assessment will appear as a separate subheading in the marks card and not be considered for pass criteria of summative examination

Summative Assessment:**Marks Distribution:**

Sl. No.	Theory	Practical	Viva	Total
Marks	200	80	20	300

Theory: 2 papers of 100 marks each.

Pattern of Assessment for Theory:

Sl. No.	Type of Question	Number	Marks
1	Long Essay questions	2 X 10	20
2	Short Essay questions	08 X 5	40
3	Short answer questions	10 X 3	30
4	Multiple Choice Questions	10 X 1	10
5	Total	30	100

TOPIC-WISE MARKS DISTRIBUTION FOR THEORY EXAMINATION

SL. NO.	TOPICS	MARKS DISTRIBUTION		
GENERAL PATHOLOGY		Minimum	Maximum	Nature of question
1.	Introduction to Pathology	0	3	Only SA
2.	Cell Injury and Adaptation	3	13	LE,SE,SA
3.	Amyloidosis	0	5	SE,SA
4.	Inflammation	3	13	LE,SE,SA
5.	Healing and repair	0	5	SE,SA
6.	Hemodynamic disorders	3	13	LE,SE,SA
7.	Neoplastic disorders	3	13	LE,SE,SA
8.	Basic diagnostic cytology	3	5	SE,SA
9.	Immunopathology and AIDS	3	8	SE,SA
10.	Infections and Infestations	0	8	SE,SA
11.	Genetic and paediatric diseases	Non-Core		
12.	Environmental and nutritional disease	0	6	SE,SA
HEMATOLOGY AND CLINICAL PATHOLOGY				
13.	Introduction to haematology	3	10	LE,SE,SA
14.	Microcytic anemia	0	10	LE,SE,SA
15.	Macrocytic anemia	0	10	LE,SE,SA
16.	Hemolytic anemia	0	10	LE,SE,SA
17.	Aplastic anemia	Non-Core		
18.	Leukocyte disorders	0	10	LE,SE,SA
19.	Lymph node and spleen	0	6	SE,SA
20.	Plasma cell disorders	0	6	SE,SA
21.	Hemorrhagic disorders	0	10	LE,SE,SA
22.	Blood banking and transfusion	0	6	SE,SA
23.	Clinical Pathology	3	6	SE,SA
SYSTEMIC PATHOLOGY				
24.	Gastrointestinal tract	3	11	LE,SE,SA
25.	Hepatobiliary system	3	11	LE,SE,SA
26.	Respiratory system	3	11	LE,SE,SA
27.	Cardiovascular system	3	15	LE,SE,SA

28.	Urinary Tract	3	11	LE,SE,SA
29.	Male Genital Tract	0	6	SE,SA
30.	Female Genital Tract	0	10	LE,SE,SA
31.	Breast	0	10	LE,SE,SA
32.	Endocrine system	0	10	LE,SE,SA
33.	Bone and soft tissue	0	10	LE,SE,SA
34.	Skin	0	6	SE,SA
35.	Central Nervous system	0	6	SE,SA
36.	Eye	Non-Core		

Note: '0' signifies there is an option of not asking any question from that particular topic

SUMMATIVE ASSESSMENT- PRACTICALS

Total Marks – 100 (Practical: 80 + Viva voce: 20)

Exercise 1- Spotters (10 x 2marks each) – 20 marks

Time allotted: 10mins

Specimens - 4

Histopathology Slides - 3

Haematology slides - 2

Instrument -1

Note: Students need to identify the spotter and write two relevant points

Exercise 2 – OSPE (Objective Structured Practical Examination) – 5 marks

Time allotted: 5mins, each will have to do either;

Blood group or Preparation of peripheral smear

Student needs to perform the following steps

Blood group		
Sl No	Steps	Marks awarded
1	Take 1 or 2 slides and mark the slides appropriately	0.5
2	Take anti-sera A, B and D and place according to the marking	1
3	Add a drop of blood to the anti-sera	0.5
4	Mix well	1
5	Look for the agglutination and interpret	2

Total	5

Preparation of peripheral smear		
Sl No	Steps	Marks awarded
1	Take a clean slide	0.5
2	Take a drop of blood and place it appropriately on the slide	0.5
3	The spreader slide is to be placed at an angle of 45 ⁰ and moved back to make contact with the drop, spreading it evenly along the line of contact. Pull the spreader steadily to make a smear and label the slide	2
4	Smear needs to be tongue shaped and without any windows,	2
Total		5

Exercise 3:

Time allotted: 20mins

Urine Analysis – 15 Marks

Physical examination + Chemical examination (Detection of 2 abnormal constituents) based on history provided

Exercise 4:

Time allotted: 20mins

Histopathology slide – 15 Marks

Identify + draw a neat labeled diagram + write points in favor of identification

Exercise 5:

Time allotted: 20mins

Peripheral Smear – 15 Marks

Identify + draw a neat labeled diagram + write points in favor of identification

Exercise 6:

Time allotted: 10mins

Chart - 10 Marks, each student is given only one chart.

Interpret the chart and answer the given questions.

NOTE: The evaluation of charts on certifiable competencies should be completed in formative and internal assessment and duly documented in the log book.

Exercise 7:

Viva Voce (20 marks)

Time allotted: 20 to 30mins (5-6mins per candidate for each examiner)

Marks allotted for each examiner – 5

tissue, Central Nervous System, Skin)

Subject allotted for each examiner:

1. Clinical Pathology and hematology
2. General Pathology
3. Systemic Pathology – I (CVS, RS, GIT, Hepatobiliary, Lymphoreticular and Spleen)
4. Systemic Pathology - II (Urinary system, Male and Female genital tract, Endocrines, Bone and Soft

tissue, Central Nervous System, Skin)

Pass Criteria:

The student should secure 40% in each theory paper and 50% of aggregate of the two papers. The student should secure 50% in practical exam + viva voce.

Blue Print for Theory Paper

SI NO	TOPICS	MARKS DISTRIBUTION		
GENERAL PATHOLOGY		Minimum	Maximum	Nature of question
1.	Introduction to Pathology	0	3	Only SA
2.	Cell Injury and Adaptation	3	13	LE,SE,SA
3.	Amyloidosis	0	5	SE,SA
4.	Inflammation	3	13	LE,SE,SA
5.	Healing and repair	0	5	SE,SA
6.	Hemodynamic disorders	3	13	LE,SE,SA
7.	Neoplastic disorders	3	13	LE,SE,SA
8.	Basic diagnostic cytology	3	5	SE,SA
9.	Immunopathology and AIDS	3	8	SE,SA
10.	Infections and Infestations	0	8	SE,SA
11.	Genetic and paediatric diseases	Non-Core		
12.	Environmental and nutritional disease	0	6	SE,SA
HEMATOLOGY AND CLINICAL PATHOLOGY				
13.	Introduction to haematology	3	10	LE,SE,SA
14.	Microcytic anemia	0	10	LE,SE,SA
15.	Macrocytic anemia	0	10	LE,SE,SA
16.	Hemolytic anemia	0	10	LE,SE,SA
17.	Aplastic anemia	Non-Core		
18.	Leukocyte disorders	0	10	LE,SE,SA
19.	Lymph node and spleen	0	6	SE,SA
20.	Plasma cell disorders	0	6	SE,SA
21.	Hemorrhagic disorders	0	10	LE,SE,SA
22.	Blood banking and transfusion	0	6	SE,SA
23.	Clinical Pathology	3	6	SE,SA
SYSTEMIC PATHOLOGY				
24.	Gastrointestinal tract	3	11	LE,SE,SA
25.	Hepatobiliary system	3	11	LE,SE,SA
26.	Respiratory system	3	11	LE,SE,SA
27.	Cardiovascular system	3	15	LE,SE,SA
28.	Urinary Tract	3	11	LE,SE,SA
29.	Male Genital Tract	0	6	SE,SA
30.	Female Genital Tract	0	10	LE,SE,SA

31.	Breast	0	10	LE,SE,SA
32.	Endocrine system	0	10	LE,SE,SA
33.	Bone and soft tissue	0	10	LE,SE,SA
34.	Skin	0	6	SE,SA
35.	Central Nervous system	0	6	SE,SA
36.	Eye	Non-Core		

Note: '0' signifies there is an option of not asking any question from that particular topic

Table: Mapping of learning outcomes to assessment

Sl. No.	Learning outcomes	Theory		Practical	
		Formative	Summative	Formative	Summative
1	Describe the structure and ultrastructure of a normal and diseased cell , pathogenesis of cell injury, intracellular accumulation, cell death, process of acute, chronic and granulomatous inflammation along with healing and Repair.	√	√		
2	Describe the concept and mechanism of immunological diseases, hypersensitivity reaction, autoimmunity, immune tolerance, transplant rejection and infectious diseases.	√	√		
3	Describe etiopathogenesis, and altered morphology of various organ systems in different diseases along with their clinical significance	√	√		

4	Collection, handling of various body fluids- blood, CSF, Urine, bone marrow and reporting			√	√
5	Interpretations of cytopenia, cytolysis including anemias, leukaemia, platelet and bleeding disorders with relevant investigations			√	√
6	Demonstrate respect in relationship with patients, fellow team members, superiors and other health care workers	√	√		
7	Attitude and communication expertise in the above scenarios	√	√		

Recommended books (latest edition):

Subject Pathology

RECOMMENDED BOOKS:

1. Kumar.V, Abbar.A.K, Aster.J.C. Robbins and Cotran Pathologic basis of Disease.10th ed, c.
2. Walter.J.B & Talbot.I.C. General Pathology.7th ed, Elsevier; 1996
3. Rubin.R, Strayer.D.S.Rubin'sPathology. 6th ed, Wolters Kluwer, Lippincott Williams and Wilkins; 2012.
4. O'Dowd G, Bell S & Wright S. Wheater's Pathology. 6th ed, Elsevier; 2020.
5. Saxena.R, Pati.H.P, Mahapatra.M, Firkin.F, Chesterman.C & Ponington.D et.al. DeGruchy`s Clinical Haematology in Medical Practice. 6th ed, Wiley India; 2012
6. Nayak.R & Rai.S. Essentials in Haematology and Clinical Pathology. Jaypee Brothers; 2017.
7. Carman. H. R. Handbook of Medical Laboratory Technology. Christian Medical Association of India. 2013.
8. Singh T. Atlas and Text of Hematology. 4th ed Avichal Publishing Company 2018.
9. Reid R, Roberts F & Macduffe. Pathology Illustrated. 7th ed Churchill Livingstone, Elsevier; 2011.
10. Curran R C, Jones E L. Gross Pathology- A Color Atlas. 4th ed. Harvey Miller Publishers.
11. Underwood`s pathology: a clinical approach 7th ed,

REFERENCE BOOKS:

LEVEL 1:

1. McKenzie.S.B,Williams.J.L.Clinical laboratory Haematology.2ed, Pearson; 2009
2. Bain.J.B,Bates.I, Laffan.M.A.Dacie and Lewis PracticalHaematology, 12ed ,Elsevier; 2017
3. Damjanov.I,Linder.J.Anderson`s Pathology.10ed,Elsevier; 2019
4. McPherson.R.A.Henry`s Clinical Diagnosis and Management by Laboratory Methods. 23ed, Elsevier; 2016

LEVEL 2 :

1. Greer.J.P,Arber.D.A,Glader.B,List.A.F,Means.R.J,Paraskevas.F et.al. Wintrobe`s ClinicalHaematology.13ed WoltersKluwer, Lippincott Williams and Wilkins, 2013
2. Rosai.J.Rosai and Ackerman`s Surgical Pathology. 11ed,Elsevier ; 2018
3. WHO Classification of Tumors Series
4. <https://whobluebooks.iarc.fr/>



Curriculum for Pharmacology 2022



**Ramaiah Medical College
Ramaiah University of Applied Sciences
Bengaluru-560054**

DEPARTMENT OF PHARMACOLOGY

CURRICULUM

Introduction

Pharmacology is the science that deals with the study of drugs. It provides scientific data, using which one can choose a drug treatment of proven efficacy and safety from the various options available to suit the patients.

The knowledge of the molecular basis of drug action, administration of drugs, the adverse effects caused by medications, its prevention and treatment and the effects of administering two or more drugs to a patient will be learnt in the context of its clinical application.

This curriculum has been designed based on the competency based medical education guidelines recommended by the National Medical Commission (NMC).

Aim:

To impart the knowledge of scientific basis of therapeutics and the skills of rational prescription of drugs through diverse teaching learning methods.

Course Outcomes:

Knowledge:

1. Describe the pharmacokinetics, pharmacodynamics, indications, contraindications, interactions and adverse reactions of commonly used drugs in therapeutics.
2. Describe the basis of evidence based medicine & the concept of rational drug therapy.

Skills:

3. Write a rational prescription for a given condition & calculate the dosage in special medical situations.
4. Recognise and report adverse drug reactions of commonly used medications.
5. Demonstrate the effects of drugs through computer aided learning & administer drugs through various routes in a simulated environment.

Attitude, Ethics and Communication (AETCOM):

6. Communicate effectively with the patient regarding use & storage of prescribed medications.
7. Identify & discuss ethical issues pertaining to patient autonomy and decision making.

Teaching Learning Methods:

The department uses diverse teaching learning methods to facilitate effective student learning.

Sl. No.	T-L Method	Number of hours
1	Interactive Lectures	80
2	Small Group Learning (Practical / tutorials/seminars/discussion/ integrated teaching)	138
3	Self-Directed Learning	12
	TOTAL	230

AETCOM

Sl. No.	T-L Method	Number of hours
1	Interactive lectures/case discussions	12

Objectives:**Knowledge:**

At the end of the course, the student should be able to:

1. Describe the pharmacokinetics, pharmacodynamics, indications, contraindications, interactions and adverse reactions of commonly used drugs in therapeutics
2. Describe the basis of evidence based medicine & the concept of rational drug therapy
3. Describe the phases and the regulations involved in the development of new drugs

Skills:

At the end of the course, the student should be able to:

1. Write a rational prescription for a given condition & calculate the dosage in special medical situations
2. Recognise and report adverse drug reactions of commonly used medications
3. Demonstrate the effects of drugs through computer aided learning & administer drugs through various routes in a simulated environment

Attitude, Ethics and Communication:

At the end of the course, the student should be able to:

1. Communicate effectively with the patient regarding use & storage of common medications
2. Communicate the importance of adherence to medications
3. Demonstrate an understanding of the legal and regulatory aspects of prescribing medications.
4. Understand and follow the ethical principles involved in prescribing
5. Identify & discuss ethical issues pertaining to patient autonomy and decision making.

List of competencies**Theory:**

PH1.1	Define and describe the principles of pharmacology and pharmacotherapeutics
PH1.2	Describe the basis of Evidence based medicine and Therapeutic drug monitoring
PH1.3	Enumerate and identify drug formulations and drug delivery systems
PH1.4	Describe absorption, distribution, metabolism & excretion of drugs
PH1.5	Describe general principles of mechanism of drug action
PH1.6	Describe principles of Pharmacovigilance & Adverse Drug Reactions (ADR) reporting systems
PH1.7	Define, identify and describe the management of ADRs
PH1.8	Identify and describe the management of drug interactions
PH1.9	Describe nomenclature of drugs i.e. generic, branded drugs
PH1.10	Describe parts of a correct, complete and legible generic prescription. Identify errors in prescription and correct appropriately
PH1.11	Describe various routes of drug administration, eg., oral, subcutaneous, intravenous, intramuscular and sublingual, etc.
PH1.12	Calculate the dosage of drugs using appropriate formulae for an individual patient, including children, elderly and patient with renal dysfunction.
PH1.13	Describe mechanism of action, types, doses, side effects, indications and contraindications of adrenergic and anti-adrenergic drugs

PH1.14	Describe mechanism of action, types, doses, side effects, indications and contraindications of cholinergic and anticholinergic drugs
PH1.15	Describe mechanism/s of action, types, doses, side effects, indications and contraindications of skeletal muscle relaxants
PH1.16	Describe mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act by modulating autacoids, including: anti-histaminics, 5-HT modulating drugs, Prostaglandin analogues, NSAIDs, drugs for gout, anti-rheumatic drugs, drugs for migraine
PH1.17	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of local anesthetics
PH1.18	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of general anesthetics, and pre-anesthetic medications
PH1.19	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act on CNS, (including anxiolytics, sedatives & hypnotics, anti-psychotic, anti-depressant drugs, anti-manics, opioid agonists and antagonists, drugs used for neurodegenerative disorders, anti-epileptics drugs)
PH1.20	Describe the effects of acute and chronic ethanol intake
PH1.21	Describe the symptoms and management of methanol and ethanol poisonings
PH1.22	Describe drugs of abuse (dependence, addiction, stimulants, depressants, psychedelics, drugs used for criminal offences)
PH1.23	Describe the process and mechanism of drug deaddiction
PH1.24	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs affecting renal systems including diuretics, antidiuretics- vasopressin and analogues
PH1.25	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs acting on blood, like anticoagulants, antiplatelets, fibrinolytics, plasma expanders
PH1.26	Describe mechanisms of action, types, doses, side effects, indications and contraindications of the drugs modulating the renin-angiotensin and aldosterone system
PH1.27	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antihypertensive drugs and drugs used in shock
PH1.28	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in ischemic heart disease (stable, unstable angina and myocardial infarction), peripheral vascular disease
PH1.29	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in congestive heart failure

PH1.30	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the anti-arrhythmics
PH1.31	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in the management of dyslipidemias
PH1.32	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in bronchial asthma and COPD
PH1.33	Describe the mechanism of action, types, doses, side effects, indications and contraindications of the drugs used in cough (antitussives, expectorants/ mucolytics)
PH1.34	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs used as below: 1. Acid-peptic disease and GERD 2. Antiemetics and prokinetics 3. Antidiarrhoeals 4. Laxatives 5. Inflammatory Bowel Disease Irritable Bowel Disorders, biliary and pancreatic diseases
PH1.35	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in hematological disorders like: 1. Drugs used in anaemias 2. Colony Stimulating factors
PH1.36	Describe the mechanism of action, types, doses, side effects, indications and contraindications of drugs used in endocrine disorders (diabetes mellitus, thyroid disorders and osteoporosis)
PH1.37	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used as sex hormones, their analogues and anterior Pituitary hormones
PH1.38	Describe the mechanism of action, types, doses, side effects, indications and contraindications of corticosteroids
PH1.39	Describe mechanism of action, types, doses, side effects, indications and contraindications the drugs used for contraception
PH1.40	Describe mechanism of action, types, doses, side effects, indications and contraindications of 1. Drugs used in the treatment of infertility, and 2. Drugs used in erectile dysfunction
PH1.41	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of uterine relaxants and stimulants
PH1.42	Describe general principles of chemotherapy

PH1.43	Describe and discuss the rational use of antimicrobials including antibiotic stewardship program
PH1.44	Describe the first line antitubercular drugs, their mechanisms of action, side effects and doses.
PH1.45	Describe the drugs used in MDR and XDR Tuberculosis
PH1.46	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antileprotic drugs
PH1.47	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in malaria, kala-azar, amoebiasis and intestinal helminthiasis
PH1.48	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in UTI/ STD and viral diseases including HIV
PH1.49	Describe mechanism of action, classes, side effects, indications and contraindications of anticancer drugs
PH1.50	Describe mechanisms of action, types, doses, side effects, indications and contraindications of immunomodulators and management of organ transplant rejection
PH1.51	Describe occupational and environmental pesticides, food adulterants, pollutants and insect repellents
PH1.52	Describe management of common poisoning, insecticides, common sting and bites
PH1.53	Describe heavy metal poisoning and chelating agents
PH1.54	Describe vaccines and their uses
PH1.55	Describe and discuss the following National Health Programmes including Immunization, Tuberculosis, Leprosy, Malaria, HIV, Filaria, Kala-azar, Diarrhoeal diseases, Anaemia & nutritional disorders, Blindness, Non-communicable diseases, cancer and Iodine deficiency
PH1.56	Describe basic aspects of Geriatric and Pediatric pharmacology
PH1.57	Describe drugs used in skin disorders
PH1.58	Describe drugs used in Ocular disorders
PH1.59	Describe and discuss the following: Essential medicines, Fixed dose combinations, Over the counter drugs, Herbal medicines
PH1.60	Describe and discuss Pharmacogenomics and Pharmacoeconomics
PH1.61	Describe and discuss dietary supplements and nutraceuticals

PH1.62	Describe and discuss antiseptics and disinfectants
PH1.63	Describe Drug Regulations, acts and other legal aspects
PH1.64	Describe overview of drug development, Phases of clinical trials and Good Clinical Practice

Practicals:

PH2.1	Demonstrate understanding of the use of various dosage forms (oral/local/parenteral; solid/liquid)
PH2.2	Prepare oral rehydration solution from ORS packet and explain its use
PH2.3	Demonstrate the appropriate setting up of an intravenous drip in a simulated environment
PH2.4	Demonstrate the correct method of calculation of drug dosage in patients including those used in special situations
PH3.1	Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient
PH3.2	Perform and interpret a critical appraisal (audit) of a given prescription
PH3.3	Perform a critical evaluation of the drug promotional literature
PH3.4	To recognize and report an adverse drug reaction
PH3.5	To prepare and explain a list of P-drugs for a given case/condition
PH3.6	Demonstrate how to optimize interaction with pharmaceutical representative to get authentic information on drugs
PH3.7	Prepare a list of essential medicines for a healthcare facility
PH3.8	Communicate effectively with a patient on the proper use of prescribed medication

PH4.1	Administer drugs through various routes in a simulated environment using mannequins
PH4.2	Demonstrate the effects of drugs on blood pressure (vasopressor and vasodepressors with appropriate blockers) using computer aided learning
PH5.1	Communicate with the patient with empathy and ethics on all aspects of drug use
PH5.2	Communicate with the patient regarding optimal use of a) drug therapy b) devices and c) storage of medicines
PH5.3	Motivate patients with chronic diseases to adhere to the prescribed management by the health care provider
PH5.4	Explain to the patient the relationship between cost of treatment and patient compliance
PH5.5	Demonstrate an understanding of the caution in prescribing drugs likely to produce dependence and recommend the line of management

AETCOM

Competency number	Competency
PH 2.5	Bioethics- case studies on patient autonomy and decision making (patient rights and shared responsibility in health care)
PH 2.6	Bioethics- case studies on patient autonomy and decision making (refusal of care including do not resuscitate and withdrawal of life Support)

Topics for integrated teaching:

No	Topics (Competencies)	Vertical Integration	Horizontal Integration
1.	Shock (PH 1.27, PA 6.3, MI 2.3.1)	General Surgery	Pharmacology Pathology Microbiology
2.	Immunology- Hypersensitivity reactions (MI 1.10, PH 1.27, PA 9.2)	-----	Pathology Pharmacology Microbiology
3.	Anaemia (PA 14, PH 1.35, MI 2.4)	General Medicine	Pharmacology Microbiology Pathology
4.	Pulmonary Tuberculosis. (PH 1.44, PA 26.4, MI 6.1.15, 6.1.16)	Com Med	Pathology Microbiology Pharmacology
5.	Malaria (MI 2.5.1, PH 1.47, PA 10.1)	Com Med	Microbiology Pathology Pharmacology
6.	Myocardial Infarction (PA 27.5, PH 1.28)	General Medicine	Pharmacology Pathology
7.	HIV and AIDS (PH 1.48, PA 9.6, MI 2.7.1, 2.7.3)	-----	Pharmacology Pathology Microbiology
8.	Diabetes Mellitus (PA 32, PH 1.36)	General Medicine	Pharmacology Pathology
9.	Hepatitis (PH 1.48,PA 25.4,MI -3.7.1, 3.7.2, 3.7.3)	-----	Pathology Microbiology Pharmacology

Assessment methods:

Formative Assessment:

The department follows the concept of continuous assessment for evaluating the students. The department of Pharmacology will conduct three formative tests and three internal assessments. These tests help students to improve their academic performance and also helps them to attend the summative examination with confidence.

Sl. No.	Assessment methods
1	Long Essay Question (LEQ), Short Essay Question (SEQ)
2	Short Answer Questions (SAQ)
3	Multiple Choice Questions (MCQ)
4	Objective Structure Practical Examination (OSPE)
5	Spotters
6	Table viva / Viva - voce

Guidelines for Internal assessment

1. The department should conduct a minimum of three internal assessments.
Internal assessment should be based on competencies and skills.
2. The structure of the internal assessment examinations should be preferably similar to the structure of university examinations.
3. It is mandatory for students to appear for all the internal assessment tests in order to obtain eligibility to appear for university / summative examination.
4. Internal assessment to be conducted at the end of each block.
5. Additional internal assessment examination for absent students can be considered due to genuine reason after approval by the head of the department. It should be taken before the submission of internal assessment marks to the University.
6. Theory internal assessment marks should include 10 marks from formative tests.

7. Theory internal assessment test is to be conducted for 60 marks (I & II IAT) /100 marks (III IAT) and will be reduced to 30 marks.
8. Average marks obtained in all three internal assessments for theory should be calculated to 40 marks.
9. Blue print to be prepared for question paper setting.
10. Practical internal assessment to be conducted for 40 marks which also includes 5 marks for maintaining practical record and log book.
- 11.** The marks obtained in the formative assessment should be displayed on the notice board within two weeks after conducting the tests.
12. Feedback on internal assessment should be provided to students throughout the course so that they are aware of their performance and remedial action can be initiated well in time.
13. It is also recommended that students should sign whenever they are shown internal assessment marks in token of having seen and discussed the marks.
14. Internal assessment marks will not be added to university examination marks and will reflect as a separate head of passing at the summative examination.
15. Learners must have completed the required certifiable competencies for that phase of training and completed the log book appropriate for that phase of training to be eligible for appearing at the final university examination of that subject.
16. There should be at least one assessment based on direct observation of skills, attitudes and communication at all levels. Communication and attitudinal assessment should also be built in to all assessments as far as possible.
17. There should be at least one short question from AETCOM

18. Criteria for appearing in university examination: Students must secure at least 50 % marks of the total marks (combined in theory and practical) and not less than 40 % marks in theory and practical separately assigned for internal assessment.
19. A student who has not secured requisite aggregate in the internal assessment may be subjected to remedial assessment by the institution. If he / she successfully completes the same is eligible to appear for university examination. Remedial assessment shall be completed before submitting the internal assessment marks to the university.

Scheme of Internal Assessment:

I. Theory:

Sl. No.	Type of Question	Marks	Marks
1	Long Essay Questions	1X10= 10	2X10 = 20
2	Short Essay Questions	05X5 = 25	08X5 = 40
3	Short Answer Questions	05X3 =15	10X3 = 30
4	Multiple Choice Questions	10X1=10	10X1 = 10
	Total	60	100

II. Practical:

Practical internal assessment to be conducted for 40 marks during first, second and 80 marks during third internal assessment.

Scheme of Practical Internal Assessment:

Sl. No	Practical Exercises	I IAT	II IAT	III IAT
1.	Dosage calculations	10	05	10
2.	Dosage forms/ ORS	10	05	10
3.	Graphs /CAL	10	05	05
4.	Drug promotional literature / p - drug	---	05	10
5.	Prescription writing	--	05	10
6.	Adverse drug reactions	05	05	10
7.	Communication exercise	---	--	05
8.	Spotters	--	05	10
9.	Record and log book	05	05	10
	TOTAL	40	40	80

Regular formative tests to be conducted in addition to the three internal assessments. These may be in the form of SAQ, MCQ, SEQ test, assignment, project, etc. These will be given weightage when considering internal assessment eligibility for summative examination.

LOG BOOK:

The log book should be completed and evaluated by the faculty on a timely basis. The same to be certified by the head of the department at the end of the programme before summative examination.

PRACTICAL RECORD:

The record should be certified before each internal assessment and final certification by the head of the department before summative examination.

Theory		Practical	
IA Theory	30	IA Practical	35
Formative Assessment	10	Record and log book	05
Total	40	Total	40

Eligibility Criteria for University Examination:

Internal Assessment: Student must secure at least 50 % marks of the total marks (combined in theory and practical) and not less than 40 % marks in theory and practical separately assigned for internal assessment.

Attendance: Student must have 75% and 80% attendance in Theory & Practicals respectively. He / she should also have 75% attendance in AETCOM.

If a student is found not to meet the criteria of eligibility for summative examination, remedial measures in the form of remedial classes/ improvement tests/assignments should be given. The student can be allowed to take up summative examination if the remedial measures are fulfilled.

Note: The internal assessment will appear as a separate subheading in the marks card and not be considered for pass criteria of summative examination

Summative Assessment:

Marks Distribution:

Sl. No.	Theory	Practical	Viva	Total
Marks	200	80	20	300

Theory: 2 papers of 100 marks each.

Pattern of Assessment for Theory:

Sl. No.	Type of Question	Number	Marks
1	Long Essay questions	2 X 10	20
2	Short Essay questions	08 X 5	40
3	Short answer questions	10 X 3	30
4	Multiple Choice Questions	10 X 1	10
5	Total	30	100

Marks Distribution for the various topics in Paper I

Sl. No.	Topic	Marks allotted
1	General pharmacology	20
2	Autonomic Nervous System	20
3	Central Nervous System & Peripheral Nervous System	26
4	Autacoids	09
5	Respiratory system	09
6	Gastro intestinal system	09
7	Miscellaneous : Common poisonings, Chelating agents, Pharmacogenomics, Pharmacoeconomics, Drug therapy in special population, Geriatric & Pediatric pharmacology, Drug regulations, Phases of clinical trial, GCP, Drug development, Pharmacovigilance, & AETCOM	07
8	Total	100

Marks Distribution for the various topics in Paper II

Sl. No.	Topic	Marks allotted
1	Endocrines including drugs acting on uterus	19
2	Drugs acting on Cardiovascular system, renal, blood and blood formation	33
3	Chemotherapy	36
4	Anticancer agents and immunomodulators	06
5	Miscellaneous- Drugs used in dermatological and ocular disorders, Vitamins, Vaccines, National Health Programmes, Nutraceuticals, Antiseptics and disinfectants, AETCOM	06
	Total	100

Practical: Maximum marks: 80

Sl. No	Assessment type	Marks
1	Dosage calculations	10
2	Dosage forms/ ORS	10
3	Graphs /Computer Assisted Learning	10
4	Critical evaluation of drug promotional literature/ Prepare and explain p-drug for a given case	10
5	Prescription writing	10
6	Adverse drug reactions	10
7	Communication exercise	10
8	Spotters	10
	TOTAL	80

Viva:

Maximum marks: 20

Viva/oral examination should assess role of drugs in therapeutics. It should also attitudinal, ethical and professional values.

Pass Criteria:

The student should secure 40% in each theory paper and 50% of aggregate of the two papers. The student should secure 50% in practical exam + viva voce.

THEORY PAPER 1 – BLUE PRINT

Sl no.	PAPER I- Topics	Competencies	Marks	Nature of questions
1	General Pharmacology	PH 1.1 to PH 1.12.	20	LEQ, SEQ, SAQ, MCQ
2	Autonomic nervous system-Adrenergic, cholinergics and their agonists & antagonists	PH 1.13 to PH 1.14	20	LEQ, SEQ, SAQ, MCQ
3	Central nervous system	PH 1.18 to PH 1.23	26	LEQ, SEQ, SAQ, MCQ
4	Peripheral nervous system (Local anaesthetics, skeletal muscle relaxants)	PH 1.15, PH 1.17		
5	Autacoids (Prostaglandins, histamine and antihistamines, Treatment of migraine) & NSAIDS & Drugs used in the treatment of gout and rheumatoid arthritis	PH 1.16	09	SEQ, SAQ, MCQ
6	Respiratory system	PH 1.32, PH 1.33	09	SEQ, SAQ, MCQ
7	Gastrointestinal system	PH 1.34	09	SEQ, SAQ, MCQ
8	Miscellaneous - Common poisonings, Chelating agents, Pharmacogenomics, Pharmacoeconomics, Drug therapy in special population, Geriatric & Pediatric pharmacology, Drug regulations, Phases of clinical trial, GCP, Drug development, Pharmacovigilance & AETCOM	PH 1.51, PH 1.52, PH 1.53, PH 1.59, PH 1.60, PH 1.56, PH 1.63, PH 1.64	07	SEQ, SAQ, MCQ
TOTAL MARKS			100	

THEORY PAPER 2 – BLUE PRINT

Sl no.	PAPER II- Topics	Competencies	Marks	Nature of questions
1	Endocrines including Hormonal contraceptives + Drugs acting on uterus	PH 1.36 to PH 1.41	19	LEQ, SEQ, SAQ, MCQ
2	Drugs acting on blood-Anticoagulants, Antiplatelets, Fibrinolytics, Plasma expanders, Anemia, erythropoietin, colony stimulating factors	PH 1.25, PH 1.35	33	SEQ, SAQ, MCQ LEQ, SEQ, SAQ, MCQ
3	Diuretics and antidiuretics	PH 1.24		
4	Cardiovascular system + treatment of shock Dyslipidemia	PH1.42 to PH 1.48, PH 1.50		
5	Chemotherapy	PH 1.49	36	LEQ, SEQ, SAQ, MCQ
6	Anti-cancer agents & Immuno-modulators	PH 1.26 to PH 1.31	6	SEQ, SAQ, MCQ
7	Miscellaneous: Drugs used in dermatological and ocular disorders, Vitamins, Vaccines, National Health Programmes, Nutraceuticals, Antiseptics, disinfectants and AETCOM	PH 1.57, PH 1.58, PH 1.54, PH 1.55, PH 1.61, PH 1.62	6	SEQ, SAQ, MCQ
	TOTAL MARKS		100	

Note: One short question to be asked in Paper I & II related to AETCOM topics (PH 2.5 & PH 2.6).

Table: Mapping of learning outcomes to assessment

Sl. No.	Learning outcomes	Theory		Practical	
		Formative	Summative	Formative	Summative
1	Describe the pharmacokinetics, pharmacodynamics, indications, contraindications, interactions and adverse reactions of commonly used drugs in therapeutics.	√	√		
2	Describe the basis of evidence based medicine & the concept of rational drug therapy.	√	√		
3	Write a rational prescription for a given condition & calculate the dosage in special medical situations.			√	√
4	Recognise and report an adverse drug reaction of commonly used medications.			√	√
5	Demonstrate the effects of drugs through computer aided learning & administer drugs through various routes in a simulated environment.			√	√
6	Communicate effectively with the patient regarding use & storage of prescribed medications.			√	√
7	Identify & discuss ethical issues pertaining to patient autonomy and decision making.	√	√		

Recommended books (latest edition):

1. Essentials of Medical Pharmacology, K D Tripathi, 8th ed., 2018, JP Brothers Medical Publisher
2. Textbook Of Pharmacology & Therapeutics, R S Satoskar, N N Rege, R K Tripathi, S D Bhandarkar, 26th ed., 2020, Elsevier.
3. Basic & Clinical Pharmacology, Bertram Katzung, 15th ed., 2021, McGraw Hill.
4. Lippincott Illustrated Reviews: Pharmacology, Karen Whalen, 8th ed., 2022, Wolters Kluwer India Pvt Ltd
5. Goodman & Gilman's The Pharmacological Basis Of Therapeutics, Laurence L Brunton, 13th ed., 2017, McGraw Hill
6. Medical pharmacology, Padmaja Udayakumar, 7th ed., 2021, CBS Publishers Ltd.
7. Manual Practical Pharmacology for MBBS , Dr.Mukta N Chowta, Dr Ashok Shenoy, 1st ed., 2016,Avichal publishing company
8. Manual Practical Pharmacology for MBBS, S K Srivastava, Rohan Srivastava1st ed., 2021, Avichal publishing company
9. Practical Manual for medical graduates Dinesh Badyal, 3rd ed., 2021 JP Bothers Medical Publisher

Curriculum for Forensic Medicine 2022



**Ramaiah Medical College
Ramaiah University of Applied Sciences
Bengaluru-560054**

FORENSIC MEDICINE & TOXICOLOGY

INTRODUCTION TO THE DEPARTMENT

The Department of Forensic Medicine and Toxicology has state of the art facilities, offering an unparalleled opportunity to study Forensic Medicine in a fully operational medico-legal environment. The Department seeks to educate and inspire the next generation of forensic medicine experts and practitioners by providing quality training through scientific excellence.

Teaching staff comprises of qualified forensic experts, training students to be adept with various medicolegal issues that they may face in their professional career. The department renders round the clock medico legal autopsy services, embalming and preservation facilities in a well-equipped and maintained separate mortuary block with a gallery for the students to witness the autopsies. The department has modern amenities and infrastructure including departmental research lab, well organized integrated museum, examination room for sexual offence cases, and a student laboratory.

Students are trained in legal aspects of medicine, medical ethics and etiquette, thanatology, sexual jurisprudence and toxicology and are also introduced to procedures such as postmortem examination, examination of victim/accused in sexual assaults, certification in injuries, drunkenness and age estimation by physical, dental and skeletal examination. Innovative teaching methods like moot court, roleplay, dumb charades, case discussions-integration with other departments in central museum etc. have been started for better understanding of the subject by the students.

AIM:

Impart quality education through innovative teaching and research.

GOAL:

The goal of teaching the undergraduate student in Forensic Medicine is to impart such knowledge and skills that may enable him to manage common medico-legal problems in day-to-day practice. He/she shall acquire competence for examination and certification of medico-legal cases.

COURSE OUTCOMES:

Knowledge:

1. Understand the various codes of conduct and ethics in medical practice.
2. Understand what constitutes medical negligence and know the measures to prevent negligence.

Skill:

3. Identify medico-legal cases and know the legal and medical responsibilities and exhibit professionalism in handling such cases.
4. Examine and Certify in various medico-legal situations viz... Age estimation, Injury certification, Drunkenness, Sexual Assault cases and Cause of Death.
5. Draft a post-mortem certificate and skeletal remains examination certificate.

Attitude, Ethics and Communication:

6. Demonstrate Communication skills in handling various medico-legal situations.

COMPETENCIES:

A. Period of Training – Phase II MBBS & Phase III part 1 MBBS

The learner must demonstrate:

- Understanding of codes of conduct and medical ethics
- Understanding the medico-legal framework of medical practice and medical negligence
- Understanding of medico-legal responsibilities of physicians in primary and secondary care settings
- Understanding of the rational approach to the investigation of crime, based on scientific and legal principles
- Ability to manage medical and legal issues in cases of poisoning / overdose and injuries

B. Period of Training – Internship An

intern must perform or assist in:

- Identifying the medico-legal responsibilities of a medical practitioner in various hospital situations
- Handling a brought-dead case in the casualty, declaring death and issuing a Cause of Death certificate
- Diagnosing and managing with competence basic poisoning conditions in the community
- Managing with competence and documentation in cases of sexual offences
- Preparing medico-legal reports in various medico legal situations

An intern must have observed or preferably assisted at the following operations/ procedures:

- Various medico legal / post-mortem procedures and formalities during their performance with police

Certifiable Procedural skills desirable of Indian Medical Graduate in Forensic Medicine & Toxicology

- Documentation and certification of trauma (I)
- Diagnosis and certification of death (D)
- Legal documentation related to medico-legal cases (D)
- Examination and certification in cases of Age estimation and Sexual Offences (D)
- Communication skills with police, public health authorities, other concerned departments, etc with respect to medico-legal cases (D)

I – Independently performed on patients

O – Observed in patients or on simulations

D – Demonstration on patients or simulations and performance under supervision in patients

Competencies in Phase II MBBS and Phase III part 1 MBBS		
No.	Topic	Competencies
1	General information	11
2	Forensic Pathology	35
3	Clinical Forensic Medicine	33
4	Medical jurisprudence (Medical Law & Ethics)	30
5	Forensic Psychiatry	06
6	Forensic laboratory investigation in medicolegal Practice	03
7	Emerging technologies in Forensic Medicine	01
8	General Toxicology	10
9	Chemical Toxicology	06
10	Pharmaceutical Toxicology	01
11	Biotoxicology	01
12	Sociomedical Toxicology	01
13	Environmental Toxicology	02
14	Skills in Forensic Medicine & Toxicology	22
TOTAL		162

Competencies in Internship			
Sl no	Topic	Competencies	Procedures requiring certification
1	Documentation and certification of trauma (I)	1	1
2	Diagnosis and certification of death (D)	1	1
3	Legal documentation related to emergency cases (D)	1	1
4	Examination and certification in cases of Age estimation and Sexual Offences (D)	3	3
5	Communication skills with police, public health authorities, other concerned departments, etc with respect to medico-legal cases (D)	3	3
Total		9	9

MINIMUM TEACHING HOURS

Forensic Medicine & Toxicology	Lectures (hours)	Small group learning (Tutorials / Seminars) /Integrated learning (hours)	Self - Directed Learning (hours)	Total (hours)
Phase II	15	30	05	50
Phase III part 1	25	45	05	75
Total	40	75	10	125

AETCOM	Lectures (hours)	Small group learning (Tutorials / Seminars) /Integrated learning (hours)	Self - Directed Learning (hours)	Total (hours)
Phase II	00	29	08	37
Phase III part 1	00	19	06	25
Total	00	48	14	62

Note : Of the 62 hours – Forensic medicine is 18 hours

MINIMUM TEACHING HOURS IN INTERNSHIP

Subject	Period of posting
Forensic Medicine & Toxicology	7 days

List of Competencies and SLOs to be covered in Phase II MBBS

GENERAL INFORMATION

☐ Lecture – 1 hr (Orientation class)

Assessment: No assessment

FM1.1 - Demonstrate knowledge of basics of Forensic Medicine like definitions of Forensic medicine, Clinical Forensic Medicine, Forensic Pathology, State Medicine, Legal Medicine and Medical Jurisprudence

1.1.1 : Define Forensic Medicine and Medical Jurisprudence.

1.1.2 : Describe different branches of Forensic medicine like Clinical Forensic Medicine, Forensic Pathology, Forensic Odontology and Forensic Psychiatry.

1.1.3 : Discuss on Forensic Medicine practice in different parts of the world.

FM1.2 -Describe history of Forensic Medicine

1.2.1 : Describe the etymology of Forensic Medicine.

1.2.2 : Describe how knowledge of medicine was applied to aid in the administration of justice from ancient time and its evolution to the recent times.

1.2.3 : Enumerate the important people and events related to Forensic Medicine.

FORENSIC PATHOLOGY

☐ Lecture – 1 hr (Interactive)

Assessment: Written, Viva voce

FM2.1 - Define, describe and discuss death and its types including somatic/clinical/cellular, molecular and brain-death, Cortical Death and Brainstem Death

2.1.1 : Define death.

2.1.2 : Describe the types of death (somatic, molecular, brain-death, cortical death and brainstem

death). 2.1.3: Describe the procedure of declaring death with specific reference to brain stem death.

FM2.2 - Describe and discuss natural and unnatural deaths

2.2.1: Describe the manner of death and cause of death

FM2.3 - Describe and discuss issues related to sudden natural deaths

2.3.1 : Define sudden natural death.

2.3.2 : Enumerate the causes for sudden natural death.

2.3.3 : Describe the medicolegal importance of sudden natural death. 2.3.4: Discuss the autopsy procedure in case of sudden natural death.

☐ SDL – 1 hr (Followed by reflective writing)

Assessment: Written, Viva voce

FM2.4 - Describe salient features of the Organ Transplantation and The Human Organ Transplant (Amendment) Act 2011 and discuss ethical issues regarding organ donation

2.4.1 : Discuss the ethical and legal issues related to organ donation and transplantation.

2.4.2 : Describe the salient features of The Human Organ Transplant Act, 1994 with amendments till date.

☐ Lecture – 1 hr (Interactive) **Assessment:** Written, Viva voce

FM2.5 - Discuss moment of death, modes of death - coma, asphyxia and syncope

2.5.1: Describe the modes of death (coma, syncope, asphyxia).

FM2.6 - Discuss presumption of death and survivorship

2.6.1: Discuss the importance of presumption of death (Sec. 107 & 108 IEA).

FM2.7 - Describe and discuss suspended animation

2.7.1 : Define suspended animation.

2.7.2 : Enumerate the causes for suspended animation.

2.7.3 : Discuss the medicolegal importance of suspended animation.

☐ **SGD – 2 hrs**

Assessment: Written, Viva voce

FM2.10 - Discuss estimation of time since death

2.10.1: Enumerate the various factors which help in determination of time since

death. 2.10.2: Discuss on Forensic entomology.

FM2.8 - Describe and discuss postmortem changes including signs of death, cooling of body, post-mortem lividity, rigor mortis, cadaveric spasm, cold stiffening and heat stiffening

2.8.1 : Classify post-mortem changes (immediate, early, late).

2.8.2 : Describe postmortem cooling and its medicolegal

importance. 2.8.3: Define postmortem lividity.

2.8.4: Describe postmortem lividity and its medico legal

importance. 2.8.5: Define rigor mortis.

2.8.6: Describe rigor mortis and its medico legal

importance. 2.8.7: Enumerate the conditions simulating rigor mortis.

2.8.8 : Define cadaveric spasm.

2.8.9 : Differentiate between cadaveric spasm and rigor mortis.

2.8.10 : Discuss on cold stiffening, heat stiffening, chemical stiffening and gas stiffening.

☐ **SGD – 1 hr**

Assessment: Written, Viva voce

FM2.9 - Describe putrefaction, mummification, adipocere and maceration

2.9.1: Describe the various changes seen in the body due to

putrefaction. 2.9.2: Define adipocere.

2.9.3: Describe adipocere and its medico legal

importance. 2.9.4: Define mummification.

2.9.5: Describe mummification and its medico legal importance.

☐ **Lecture – 1 hr**

Assessment: Written, Viva voce

FM2.11 - Describe and discuss autopsy procedures including post-mortem examination, different types of autopsies, aims and objectives of post-mortem examination

2.11.1 : Describe the types of autopsy.

2.11.2 : Enumerate the objectives of medicolegal

autopsy. 2.11.3: Enumerate the objectives of foetal autopsy.

2.11.4: Enumerate the objectives of skeletal remains examination.

FM2.14 - Describe and discuss examination of clothing, preservation of viscera on post-mortem examination for chemical analysis and other medico-legal purposes, post-mortem artefacts

2.14.1 : Describe the method of preservation and dispatch of viscera and body fluids for chemical analysis.

2.14.2 : Describe the method of preservation and dispatch of viscera and body fluids for histopathology and microbiological investigations.

2.14.3 : Describe the method of preservation and dispatch of clothes in a medicolegal

case. 2.14.4: Discuss on postmortem artefacts and their medicolegal importance

FM8.5 - Describe Medico-legal autopsy in cases of poisoning including preservation and dispatch of viscera for chemical analysis

8.5.1: Explain the procedure of medico-legal autopsy in a suspected case of poisoning. 8.5.2: Describe the method of preserving the various viscera in a case of poisoning.

8.5.3: Describe the procedure for dispatch of viscera for chemical analysis in a case of poisoning.

FM8.9 - Describe the procedure of intimation of suspicious cases or actual cases of foul play to the police, maintenance of records, preservation and dispatch of relevant samples for laboratory analysis.

8.9.1 : Describe the procedure of intimation of suspicious cases or actual cases of foul play to the police

□ S. 39 CrPC, S. 40 CrPC, S. 175 CrPC.

□ S. 166 (B) IPC, S. 176 IPC, S. 177 IPC, S. 201 IPC, S. 202 IPC.

8.9.2 : Describe the procedure of record maintenance in a case of poisoning.

8.9.3 : Describe the procedure of collection and dispatch of viscera for chemical analysis in a case of poisoning.

□ **Lecture – 1 hr**

Assessment: Written, Viva voce

FM2.12 - Describe the legal requirements to conduct post-mortem examination and procedures to conduct medico-legal post-mortem examination

2.12.1: Describe the rules for conducting medicolegal autopsy. 2.12.2: Enumerate the skin incisions in medicolegal autopsy.

2.12.3 : Enumerate the methods of evisceration in medicolegal autopsy.

2.12.4 : Describe the external and internal examination in medicolegal autopsy.

2.12.5 : Explain the special techniques used in medicolegal autopsy (demonstration of pneumothorax, air embolism, etc).

FM2.13 - Describe and discuss obscure autopsy

2.13.1: Discuss on obscure autopsy with examples.

2.13.2: Discuss on negative autopsy with examples. **FM2.17 - Describe and discuss**

exhumation 2.17.1: Define exhumation.

2.17.2: Enumerate the objectives of exhumation.

2.17.3: Describe the rules and procedure of exhumation.

□ **SGD – 4 hrs (Practical)**

Assessment: Written, Viva voce, OSPE, Practical book, Log book

FM2.16 - Describe and discuss examination of mutilated bodies or fragments, charred bones and bundle of bones

2.16.1 : Describe the procedure of examination of mutilated bodies / fragments.

2.16.2 : Describe the procedure of examination of skeletal remains (including charred bones).

***FM14.9 - Demonstrate examination of & present an opinion after examination of skeletal remains in a simulated/ supervised environment**

14.9.1 : Enumerate the objectives of skeletal remains examination.

14.9.2 : Demonstrate the procedure of examination of skeletal remains in a simulated/ supervised environment.

14.9.3: Draft a medicolegal report and opinion after examination of skeletal remains.

□ **SGD – 1 hr**

Assessment: Written, Viva voce

FM2.18 - Crime Scene Investigation: -

Describe and discuss the objectives of crime scene visit, the duties & responsibilities of doctors on crime scene and the reconstruction of sequence of events after crime scene investigation

2.18.1 : Enumerate the objectives of crime scene visit by an autopsy surgeon.

2.18.2 : Describe the procedure of examination of crime scene and preservation of evidentiary material.

2.18.3: Explain the reconstruction of a case after the crime scene visit.

□ **SGD – 1 hr**

Assessment: Viva voce

FM2.31 - Demonstrate ability to work in a team for conduction of medico-legal autopsies in cases of death following alleged medical negligence, dowry death, death in custody or following violation of human rights as per National Human Rights Commission Guidelines on exhumation

2.31.1: Demonstrate the benefit of team work in a medicolegal autopsy of alleged medical negligence. 2.31.2: Demonstrate the benefit of team work in a medicolegal autopsy of alleged dowry death.

2.31.3 : Demonstrate the benefit of team work in a medicolegal autopsy of alleged custodial death.

2.31.4 : Demonstrate the benefit of team work in a medicolegal autopsy of death due to violation of human rights.

2.31.5: Demonstrate the benefit of team work in exhumation.

□ **SDL – 1 hr**

Assessment: Written, Viva voce

FM2.19 - Investigation of anaesthetic, operative deaths: Describe and discuss special protocols for conduction of autopsy and for collection, preservation and dispatch of related material evidences

2.19.1 : Explain the significance of autopsy in operative deaths.

2.19.2 : Describe the procedure of autopsy in operative deaths.

2.19.3 : Describe the procedure of preservation and dispatch of evidentiary material for investigation in deaths associated with anaesthesia and surgery

□ **SDL – 1 hr**

Assessment: Written, Viva voce

FM2.15 - Describe special protocols for conduction of medico-legal autopsies in cases of death in custody or following violation of human rights as per National Human Rights Commission Guidelines

2.15.1: Describe the National Human Rights Commission guidelines for conduction of medicolegal autopsy in cases of death in custody or violation of human rights.

□ **SGD – 1 hr**

Assessment: OSPE, Written, Viva voce

FM2.32 - Demonstrate ability to exchange information by verbal or nonverbal communication to the peers, family members, law enforcing agency and judiciary

2.32.1 : Demonstrate the skills of communication by a doctor with the peers.

2.32.2 : Demonstrate the skills of communication by a doctor with the patient's family members in MLC works at casualty.

2.32.3 : Demonstrate the skills of communication by a doctor with the deceased family members during medicolegal autopsy.

2.32.4 : Demonstrate the skills of communication by a doctor with the law enforcing agency/ judiciary in medicolegal practices.

FM2.33 & FM2.34 - Demonstrate ability to use local resources whenever required like in mass disaster situations

2.33.1 : Define Mass disaster

2.33.2 : Enumerate the types of Mass disaster.

2.33.3 : List the objectives of forensic investigation in mass disasters.

2.33.4: Describe the procedure of examination at disaster site and

autopsy. 2.33.5: Describe the evidentiary materials to be preserved in mass disasters. 2.33.6: Demonstrate the importance of team work in Mass Disasters.

FM2.35 - Demonstrate professionalism while conducting autopsy in medicolegal situations, interpretation of findings and making inference/opinion, collection, preservation and dispatch of biological or trace evidences

2.35.1: Demonstrate the professionalism of a doctor during conduction of medicolegal autopsies (such as interaction with investigating officer/relatives of deceased, receiving inquest form, maintaining confidentiality, etc).

2.35.2 : Demonstrate the professionalism in preservation and dispatching evidentiary materials to FSL (such as proper method of preservation and dispatch of materials with necessary forms and maintaining confidentiality).

2.35.3 : Demonstrate the professionalism in preservation and dispatching evidentiary materials to histopathology and microbiology investigations (such as proper method of preservation and dispatch of materials with necessary forms and maintaining confidentiality).

2.35.4 : Demonstrate the professionalism while giving opinion in medicolegal cases (such as honesty with unbiased inferences).

CLINICAL FORENSIC MEDICINE

□ **SGD – 2 hrs**

Assessment: Written, Viva voce

FM3.1 - IDENTIFICATION

Define and describe Corpus Delicti, establishment of identity of living persons including race, Sex, religion, complexion, Stature, age determination using morphology, teeth-eruption, decay, bite marks, bones-ossification centres, medicolegal aspects of age

3.1.1 : Define Corpus delicti

3.1.2 : Describe the importance of corpus delicti in establishing the

crime. 3.1.3: List the various means of identification in living and dead persons.

3.1.4 : Explain the role of hand writing analysis, gait, speech, photography and facial description as a tool of identification.

3.1.5 : Describe the methods of determination of race.

3.1.6 : Describe the methods of sex determination in a living

person. 3.1.7: Describe the methods of sex determination in a dead person. 3.1.8: Define intersex.

3.1.9: Describe the types of intersex and its medicolegal importance.

3.1.10: Describe the methods of age determination in a living person.

3.1.11: Describe the methods of age determination in a dead person.

3.1.12: Explain the method of age estimation using Gustafson's technique. 3.1.13: Discuss the forensic aspects related to teeth.

3.1.14: Describe the methods of determination of stature.

☐ **SGD – 1 hr**

Assessment: Written, Viva voce

FM3.2 - IDENTIFICATION

Describe and discuss identification of criminals, unknown persons, dead bodies from the remains-hairs, fibres, teeth, anthropometry, dactylography, foot prints, scars, tattoos, poroscopy & superimposition

3.2.1: Explain the role of hair in the identification of an

individual. 3.2.2: Describe the medicolegal importance of hair.

3.2.3: Describe the dyes used, methods of erasure and medicolegal importance of a tattoo. 3.2.4: Describe the medicolegal importance of the scar.

3.2.5 : Define anthropometry.

3.2.6 : Describe various data included in anthropometry and its importance in identification. 3.2.7: Define dactylography.

3.2.8: Describe the types, method of collection and medicolegal importance of

dactylography. 3.2.9: Discuss the role of poroscopy, cheiloscopy and rugoscopy in identification.

3.2.10 : Describe the role of foot prints in establishing the identity.

3.2.11 : Describe the role of facial reconstruction in establishing the

identity. 3.2.12: Discuss the role of superimposition in establishing the identity.

☐ **SGD – 2 hrs (Practical)**

Assessment: OSPE, Practical book, Log book

FM14.6 - Demonstrate and interpret medico-legal aspects from examination of hair (human & animal) fibre, semen & other biological fluids

14.6.1 : Identify hair (human/ animal), other fibres by physical and microscopic examination and describe its medicolegal importance.

14.6.2 : Identify the semen by physical and microscopic examination and describe its medicolegal importance. **FM14.7 - Demonstrate & identify that a particular stain is blood and identify the species of its origin** 14.7.1: Identify the blood by physical and microscopic examination.

14.7.2: Explain the various medicolegal conclusions by examining the blood stains. 14.7.3: Explain the method of identifying the species of origin of the blood stain.

FM14.8 - Demonstrate the correct technique to perform and identify ABO & RH blood group of a person

14.8.1: Perform the technique of identifying the ABO blood group of a person. 14.8.2: Perform the technique of identifying the Rh blood group of a person.

TOXICOLOGY: GENERAL TOXICOLOGY

□ **SDL – 1 hr**

Assessment: Written, Viva Voce

FM8.1 - Describe the history of Toxicology

8.1.1: Describe the history of Toxicology.

□ **Lecture – 1 hr**

Assessment: Written, Viva Voce

FM8.2 - Define the terms Toxicology, Forensic Toxicology, Clinical Toxicology and poison

8.2.1: Define Toxicology, Forensic Toxicology, Clinical Toxicology and Poison

FM8.3 - Describe the various types of poisons, Toxicokinetics, and Toxicodynamics and diagnosis of poisoning in living and dead

8.3.1: Classify poisons in respect to mode of action and mode of usage. 8.3.2: Describe pharmacokinetics & pharmacodynamics of the poisons. 8.3.3: Explain the diagnosis of poisoning in the living individual.

8.3.4: Explain the diagnosis of poisoning in the dead individual

FM8.4 - Describe the Laws in relations to poisons including NDPS Act, Medico-legal aspects of poisons

8.4.1 : Describe the legal sections related to poisoning in India.

- □ S. 85 IPC, S. 86 IPC, S. 274 IPC, S. 284 IPC, S. 299 IPC, S. 300 IPC, S. 304 (A) IPC, S. 375 IPC
- □ S. 324 IPC, S. 325 IPC, S. 326 IPC, S. 326A IPC, S. 326B IPC, S. 328 IPC
- □ S. 357C CrPC
- S. 185 IMV Act, S. 203 IMV Act, S. 204 IMV Act

8.4.2 : Describe Narcotic Drugs and Psychotropic Substances Act, 1985.

8.4.3: Describe Karnataka Poisons (Possession and Sale) Rules, 2015.

8.4.4: Describe the legal responsibilities of a doctor in a case of poisoning

FM8.6 - Describe the general symptoms, principles of diagnosis and management of common poisons encountered in India

8.6.1: Describe the general symptoms and signs of the common poisons encountered in India. 8.6.2: Describe the general principles of diagnosis of the common poisons encountered in India. 8.6.3: Enumerate the line of management of the common poisons encountered in India.

□ **Lecture – 1 hr**

Assessment: Written, Viva Voce

FM8.8 - Describe basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination

8.8.1: List the general treatment procedure in case of poisoning. 8.8.2: Explain the procedure of Gastric lavage. 8.8.3: Enumerate the indications and contraindications for Gastric lavage. 8.8.4: Define antidote. 8.8.5: Describe the various types of antidotes. 8.8.6: Explain Chelation therapy. 8.8.7: Describe the methods for hastening elimination of absorbed poison.

□ **Lecture – 1 hr**

Assessment: Written, Viva Voce

FM8.10 - Describe the general principles of Analytical Toxicology and give a brief description of analytical methods available for toxicological analysis: Chromatography – Thin Layer Chromatography, Gas Chromatography, Liquid Chromatography and Atomic Absorption Spectroscopy

8.10.1: List the various analytical methods used in Toxicology. 8.10.2: Describe the general principle of Thin Layer Chromatography. 8.10.3: Describe the basic principle and uses of Gas Chromatography. 8.10.4 : Describe the basic principle and uses of Liquid Chromatography. 8.10.5 : Describe the basic principle and uses of Atomic Absorption Spectroscopy. 8.10.6: Describe the basic principle and uses of Mass Spectrometry. 8.10.7: Describe the basic principle and uses of Radio-Immuno Assay

□ **SGD – 2 hrs (Practical/ Skills lab)**

Assessment: OSPE, Written, Viva Voce

FM14.2 - Demonstrate the correct technique of clinical examination in a suspected case of poisoning & prepare medico-legal report in a simulated/ supervised environment

14.2.1 : Take an informed consent from the Patient / Guardian after explaining the importance of MLC registration in Poisoning cases. 14.2.2 : Perform the clinical examination (history taking, general physical examination, systemic examination, laboratory investigations, differential diagnosis) in poisoning cases in a simulated/ supervised environment. 14.2.3 : Prepare the medicolegal certificate after documenting the clinical findings. 14.2.4: Prepare the police intimation.

FM14.3 - Assist and demonstrate the proper technique in collecting, preserving and dispatch of the exhibits in a suspected case of poisoning, along with clinical examination

14.3.1 : Demonstrate the process of collecting, preserving and dispatch of the materials/ exhibits in a suspected case of **ingested poisoning**.

14.3.2 : Demonstrate the process of collecting, preserving and dispatch of the materials/ exhibits in a suspected case of **inhalation poisoning** along with clinical examination.

14.3.3 : Demonstrate the process of collecting, preserving and dispatch of the materials/ exhibits in a suspected case of **injected poisoning** along with clinical examination.

FM8.7 - Describe simple Bedside clinic tests to detect poison/drug in a patient's body fluids

8.7.1 : Describe the bedside clinic tests for Hydrochloric acid poisoning (Ammonia test, Litmus paper test, Silver nitrate test).

8.7.2 : Describe the bedside clinic tests for Nitric acid poisoning (Ferrous Sulphate test).

8.7.3: Describe the bedside clinic tests for Sulphuric acid poisoning (Litmus paper test).

8.7.4: Describe the bedside clinic tests for Oxalic acid poisoning (Barium nitrate test).

8.7.5: Describe the bedside clinic tests for Caustic alkalis poisoning (Litmus paper test).

8.7.6: Describe the bedside clinic tests for Phenol (Folin Ciocalteu reagent test).

8.7.7: Describe the bedside clinic tests for Salicylates (Trinder's reagent test).

TOXICOLOGY : CHEMICAL TOXICOLOGY

☐ **SGD – 2 hrs**

Assessment: Written, Viva voce

FM9.1 - Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to: Caustics Inorganic – sulphuric, nitric, and hydrochloric acids; Organic-Carboic Acid (phenol), Oxalic and acetylsalicylic acids:
Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Sulphuric acid poisoning.

9.1.1 : Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Nitric acid poisoning.

9.1.2 : Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Hydrochloric acid poisoning.

9.1.3 : Discuss on Vitriolage.

9.1.4 : Describe the characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Carboic acid poisoning.

9.1.5 : Discuss on Carboluria.

9.1.6 : Describe the characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Oxalic acid poisoning.

9.1.7 : Discuss on Oxaluria.

9.1.8 : Describe the characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Acetylsalicylic acid poisoning.

☐ **Lecture – 1 hr**

Assessment: Written, Viva voce

FM9.2 - Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Phosphorus, Iodine, Barium

9.2.1 : Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Phosphorus poisoning.

9.2.2 : Discuss on Phossy jaw.

9.2.3 : Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Iodine poisoning.

9.2.4 : Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Barium poisoning.

□ **Lecture – 2 hrs**

Assessment: Written, Viva voce

FM9.3 - Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Arsenic, lead, mercury, copper, iron, cadmium and thallium

9.3.1 : Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Arsenic poisoning.

9.3.2 : Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Lead poisoning.

9.3.3 : Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Mercury poisoning.

9.3.4 : Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Copper poisoning.

9.3.5 : Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Iron poisoning.

9.3.6 : Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Thallium poisoning.

9.3.7 : Describe the characteristics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Cadmium poisoning.

9.3.8 : Describe the causes, clinical features and treatment of Metallic fume fever.

□ **Lecture – 2 hrs**

Assessment: Written, Viva voce

FM9.4 - Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Ethanol, methanol, ethylene glycol

9.4.1 : Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of ethanol intoxication.

9.4.2 : Define drunkenness.

9.4.3 : Describe the methods of detection of drunken person in legal situations.

9.4.4 : Describe clinical features, treatment and medicolegal aspects of chronic alcoholism.

9.4.5 : Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects in a case of methanol poisoning.

9.4.6 : Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment and medicolegal aspects of ethylene glycol poisoning.

□ **SGD – 2 hrs (Integration – Pharmacology)**

Assessment: Written, Viva Voce

FM9.5 - Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Organophosphates,

Carbamates, Organochlorines, Pyrethroids, Paraquat, Aluminium and Zinc phosphide

9.5.1 : Classify agricultural poisons.

9.5.2 : Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Organo-phosphorous poisoning.

9.5.3 : Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Carbamate poisoning.

9.5.4 : Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Organo-chlorine poisoning.

9.5.5 : Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Paraquat poisoning.

9.5.6 : Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Pyrethroid poisoning.

9.5.7 : Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Aluminum and Zinc phosphide poisoning.

□ SGD – 1 hr

Assessment: Written, Viva Voce

FM9.6 - Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Ammonia, carbon monoxide, hydrogen cyanide & derivatives, methyl isocyanate, tear (riot control) gases

9.6.1 : Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Ammonia poisoning.

9.6.2 : Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings & medicolegal aspects of Carbon monoxide poisoning.

9.6.3 : Describe physical/chemical characteristics, pharmacokinetics, mechanism of action, fatal dose, fatal period, clinical features, treatment, postmortem findings and medicolegal aspects of Cyanide poisoning.

9.6.4 : Describe physical/chemical characteristics, mechanism of action, clinical features, treatment, postmortem findings and medicolegal aspects of Methyl Isocyanate poisoning.

9.6.5 : Describe clinical features, treatment and medicolegal aspects of exposure to tear gas (in riot control).

TOXICOLOGY : PHARMACEUTICAL TOXICOLOGY

□ SDL – 1 hr (Integration – Pharmacology) Assessment: Written, Viva Voce

FM10.1 - Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to:

i. Antipyretics – Paracetamol, Salicylates

ii. Anti-Infectives (Common antibiotics – an overview)

iii. Neuropsychotoxicology Barbiturates, benzodiazepins, phenytoin, lithium, haloperidol, neuroleptics, tricyclics

iv. Narcotic Analgesics, Anaesthetics, and Muscle Relaxants

v. Gastro-Intestinal and Endocrinal Drugs – Insulin

10.1.1 : Describe clinical features, treatment and medico-legal aspects of poisoning due to Antipyretics (such as Paracetamol and Salicylates).

10.1.2 : Describe clinical features, treatment and medico-legal aspects of poisoning due to Anti-Infective overdose (common antibiotics).

- 10.1.3 : Describe clinical features, treatment, post-mortem findings and medico-legal aspects of Barbiturate poisoning.
- 10.1.4 : Describe clinical features, treatment and medico-legal aspects of Benzodiazepine poisoning.
- 10.1.5 : Describe clinical features, treatment, post-mortem findings and medico-legal aspects of opium and its alkaloids.
- 10.1.6 : Describe clinical features, treatment, post-mortem findings and medico-legal aspects of poisoning due to Gastro-Intestinal and Endocrinal Drugs (e.g., Insulin).

☐ **Lecture – 1 hr Assessment:** Written, Viva voce

FM10.1 vi - Cardiovascular Toxicology Cardiotoxic plants – oleander, odollam, aconite, digitalis

- 10.1.7 : Enumerate the cardiotoxic plants.
- 10.1.8 : Describe the active principles, mechanism of action, fatal dose, fatal period, clinical features, treatment, post- mortem findings and medico-legal aspects of poisoning due to cardiotoxic plants.

Toxicology : Biotoxicology

☐ **SGD – 2 hrs Assessment:** Written, Viva Voce

FM11.1 - Describe features and management of Snake bite, scorpion sting, bee and wasp sting and spider bite

- 11.1.1: Differentiate poisonous and non-poisonous snakes. 11.1.2: Classify poisonous snakes.
- 11.1.3 : Identify the common poisonous and non-poisonous snakes in India.
- 11.1.4 : Describe mechanism of action, clinical features, management, postmortem findings and medicolegal aspects of snake bite (Ophitoxaemia).
- 11.1.5 : Identify the common scorpions seen in India.
- 11.1.6 : Describe mechanism of action, clinical features, management, postmortem findings and medicolegal aspects of scorpion sting.
- 11.1.7 : Describe mechanism of action, clinical features, management, postmortem findings and medicolegal aspects of bee and wasp sting, and spider bite.

TOXICOLOGY : ENVIRONMENTAL TOXICOLOGY

☐ **Lecture – 1 hr Assessment:** Written, Viva voce

FM13.1 - Describe toxic pollution of environment, its medico-legal aspects & toxic hazards of occupation and industry

- 13.1.1 : Enumerate the causes for environmental pollution.
- 13.1.2 : Describe the health effects of environmental pollution due to toxic substances.
- 13.1.3: Describe the medico-legal aspects of toxic hazards on employees of an industry

FM13.2 - Describe medico-legal aspects of poisoning in Workman's Compensation Act

- 13.2.1 : Describe the medico-legal issues arising out of effects of poisoning due to occupational exposure as per Workman's Compensation Act.
- 13.2.2 : Discuss the role of physician in cases of poisoning due to occupational exposure.

TOXICOLOGY : SOCIOMEDICAL TOXICOLOGY

☐ **Lecture – 2 hrs Assessment:** Written, Viva voce

FM12.1 - Describe features and management of abuse/ poisoning with following chemicals: Tobacco,

cannabis, amphetamines, cocaine, hallucinogens, designer drugs & solvent

12.1.1: Define drug abuse, drug addiction, drug habituation and drug dependence. 12.1.2: List the drugs of abuse.

12.1.3 : Describe clinical features, treatment, post-mortem findings and medico-legal aspects of acute and chronic tobacco poisoning.

12.1.4 : Enumerate the active principles and various preparations of cannabis.

12.1.5 : Describe clinical features, treatment, post-mortem findings and medico-legal aspects of acute and chronic cannabis poisoning.

12.1.6 : Describe clinical features, treatment, post-mortem findings and medico-legal aspects of acute and chronic cocaine poisoning.

12.1.7 : Describe clinical features, treatment, post-mortem findings and medico-legal aspects of amphetamine poisoning.

12.1.8 : Enlist hallucinogenic substances.

12.1.9 : Describe clinical features, treatment, post-mortem findings and medico-legal aspects of Lysergic acid diethylamide poisoning.

12.1.10 : Define 'Designer drug'.

12.1.11 : Describe the clinical features and management of common designer drugs. 12.1.12: Define 'Solvent abuse'.

12.1.13: Describe clinical features, treatment, post-mortem findings and medico-legal aspects of Solvent abuse. 12.1.14: Discuss on Body packer's syndrome.

SKILLS IN FORENSIC MEDICINE & TOXICOLOGY

☐ **SGD – 2 hrs (Practical) Assessment:** OSPE, Practical book, Log book, Viva Voce

FM14.17 - To identify & draw medico-legal inference from common poisons e.g. dhatura, castor, cannabis, opium, aconite copper sulphate, pesticides compounds, marking nut, oleander, Nux vomica, abrus seeds, Snakes, capsicum, calotropis, lead compounds & tobacco.

14.17.1 : Identify with physical and /or chemical characteristics of the common poisons e.g. dhatura, castor, cannabis, opium, aconite, copper sulphate, pesticide compounds, marking nut, oleander, Nux vomica, abrus seeds, snakes, capsicum, calotropis, lead compounds & tobacco. (*regional / local poisons*)

14.17.2 : Draw the medico-legal inferences with the use of the common poisons.

☐ **SGD – 5 hrs (Practical – 5 cases) Assessment:** OSPE, Practical book, Log book, Viva Voce

FM14.5 - Conduct & prepare post-mortem examination report of varied aetiologies (at least 15) in a simulated/ supervised environment

14.5.1 : Describe the techniques of conducting a medicolegal autopsy.

14.5.2 : Describe the postmortem findings (external and internal) in a medicolegal autopsy.

14.5.3 : Enumerate the ancillary investigations required (along with appropriate materials for such investigations) in a medicolegal autopsy.

14.5.4 : Draft the postmortem report after a medicolegal autopsy.

Medicolegal autopsies may be a case of unnatural death, natural death, custodial death, alleged medical negligence, decomposed body, mutilated body.

☐ **SGD – 1 hr (Practical) Integration Pathology Assessment:** OSPE, Practical book, Log book, Viva Voce **FM14.19 - To identify & prepare medico-legal inference from histo-pathological slides of Myocardial Infarction,**

pneumonitis, tuberculosis, brain infarct, liver cirrhosis, Pulmonary oedema, (remaining slides will be covered in phase 3 MBBS)

- 14.19.1 : List the microscopic identifying features after examining the histopathological slides of myocardial Infarction, pneumonitis, tuberculosis, brain infarct, liver cirrhosis, pulmonary oedema.
- 14.19.2 : Describe the medico-legal inferences after examining the above-mentioned histopathological slides.

Summary of TL methods and list of competencies to be covered in Phase II MBBS and Assessment methods

Sl. No.	Teaching hours and type	Competency numbers	Assessment methods
1.	Lecture – 1 hr (Orientation class)	1.1, 1.2	No assessment
2.	Lecture – 1 hr (Interactive)	2.1, 2.2, 2.3	Written, Viva voce

3.	SDL – 1 hr (Followed by reflective writing)	2.4	Written, Viva voce
4.	Lecture – 1 hr (Interactive)	2.5, 2.6, 2.7	Written, Viva voce
5.	SGD – 2 hrs	2.10, 2.8	Written, Viva voce
6.	SGD – 1 hr	2.9	Written, Viva voce
7.	Lecture – 1 hr	2.11, 2.14, 8.5, 8.9	Written, Viva voce
8.	Lecture – 1 hr	2.12, 2.13, 2.17	Written, Viva voce
9.	SGD – 4 hrs (Practical)	2.16, 14.9	Written, Viva voce, OSPE, Practical book, Log book
10.	SGD – 1 hr	2.18	Written, Viva voce
11.	SGD – 1 hr	2.31	Viva voce
12.	SDL – 1 hr	2.19	Written, Viva voce
13.	SDL – 1 hr	2.15	Written, Viva voce
14.	SGD – 1 hr	2.32, 2.33, 2.34, 2.35	OSPE, Written, Viva voce
15.	SGD – 2 hrs	3.1	Written, Viva voce
16.	SGD – 1 hr	3.2	Written, Viva voce
17.	SGD – 2 hrs (Practical)	14.6. 14.7, 14.8	OSPE, Practical book, Log book
18.	SDL – 1 hr	8.1	Written, Viva voce
19.	Lecture – 1 hr	8.2, 8.3, 8.4, 8.6	Written, Viva voce
20.	Lecture – 1 hr	8.8	Written, Viva voce

21.	Lecture – 1 hr	8.10	Written, Viva voce
22.	SGD – 2 hrs (Practical/ Skills lab)	14.2, 14.3, 8.7	OSPE, Written, Viva Voce
23.	SGD – 2 hrs	9.1	Written, Viva voce
24.	Lecture – 1 hr	9.2	Written, Viva voce
25.	Lecture – 2 hrs	9.3	Written, Viva voce
26.	Lecture – 2 hrs	9.4	Written, Viva voce
27.	SGD – 2 hrs (Integration – Pharmacology)	9.5	Written, Viva voce
28.	SGD – 1 hr	9.6	Written, Viva voce
29.	SDL – 1 hr (Integration – Pharmacology)	10.1 (i-v)	Written, Viva voce
30.	Lecture – 1 hr	10.1 (vi)	Written, Viva voce
31.	SGD – 2 hrs	11.1	Written, Viva voce
32.	Lecture – 1 hr	13.1, 13.2	Written, Viva voce

List of Competencies and SLOs to be covered in Phase III MBBS part 1

General Information

- **Lecture – 1 hr (Orientation class/ SDL)**

Assessment: No assessment

FM 1.3 - Describe legal procedures including Criminal Procedure Code, Indian Penal Code, Indian Evidence Act, Civil and Criminal Cases, Inquest (Police Inquest and Magistrate's Inquest), Cognizable and Non-cognizable offences

- 1.3.1: Describe the meaning of Criminal Procedure Code, Indian Penal Code, and Indian Evidence Act.
- 1.3.2: Differentiate between civil and criminal cases and their proceedings in the court of law.
- 1.3.3: Define inquest.
- 1.3.4: Describe the types of inquest practiced in India.
- 1.3.5: Discuss the meaning of cognizable and non-cognizable offence with examples.

FM 1.4 - Describe Courts in India and their powers: Supreme Court. High Court, Sessions court, Magistrate's Court. Labour Court. Family Court, Executive Magistrate Court and Juvenile Justice Board

- 1.4.1: List various civil and criminal courts in India.
- 1.4.2: Describe the location, presiding officer and powers of various courts in India.

FM 1.5 - Describe Court procedures including issue of summons, conduct money, types of witnesses, recording of evidence: oath, affirmation, examination in chief, cross examination, re-examination & court questions, recording of evidence & conduct of doctor in witness box.

- 1.5.1: Define 'Summons'.
- 1.5.2: Describe the formalities to be followed by a doctor while receiving summons and consequence of not honouring the summons.
- 1.5.3: Define 'Witness'.
- 1.5.4: Describe the types of witness.
- 1.5.5: Define 'Evidence'.
- 1.5.6: Describe the types of evidence.
- 1.5.7: Describe the steps of recording evidence in the court of law.
- 1.5.8: Describe the conduct of a doctor in the witness box.

FM 1.6 - Describe the offences in Court including Perjury; Court strictures vis-a-vis medical officer

- 1.6.1: Explain the meaning of perjury and its punishment.
- 1.6.2: Mention the various offences that could be charged upon medical officer by the court of law and its punishment.

- **SGD – 2 hrs (Moot Court)**

Assessment: Log book / Viva voce / OSCE

FM14.22 - To give expert medical/ medico-legal evidence in Court of law

- 14.22.1: Describe **conduct of a doctor in witness box** during the process of deposing expert medical/ medico-legal evidence in Court of law.

14.22.2: Describe **the steps /procedure of recording of expert medical/ medico-legal evidence** in Court of law with relation to Court procedures.

FM2.29 - Demonstrate respect to the directions of courts, while appearing as witness for recording of evidence under oath or affirmation, examination in chief, cross examination, re-examination and court questions, recording of evidence

2.29.1: Demonstrate the procedure of receiving summons.

2.29.2: Demonstrate the oath taking in the court of law.

2.29.3: Demonstrate the procedure of recording of evidence in court of law (examination in chief, cross examination, re-examination, question by Judge).

2.29.4: Demonstrate the doctor's professionalism (attitude and subject expertise) expected in the witness box.

- **SGD – 1 hr (Role play)**
station

Assessment: Log book / Viva voce / OSCE / Skill

FM 1.7 - Describe Dying Declaration and Dying Deposition.

1.7.1: Define dying declaration and dying deposition.

1.7.2: Describe the procedure of recording of dying declaration.

1.7.3: Differentiate between dying declaration and dying deposition.

FM14.20 - To record and certify dying declaration in a simulated/ supervised environment

14.20.1: Certify compos mentis (sound mind) by examining higher mental functions before recording of dying declaration in a simulated environment.

14.20.2: Record dying declaration in a simulated environment.

14.20.3: Assist the executive magistrate in recording of dying declaration in a simulated environment

- **Lecture – 1 hr**

Assessment: Written, Viva voce

FM 1.8 - Describe the latest decisions/ notifications/resolutions/circulars/ standing orders related to medico-legal practice issued by Courts/Government authorities etc.

1.8.1: Describe the latest decisions/notifications/resolutions/ circulars/ standing orders related to medico-legal practice issued by Courts.

1.8.2: Describe the latest decisions/notifications/resolutions/ circulars/ standing orders related to medico-legal practice issued by Central Government authorities.

1.8.3: Describe the latest decisions/notifications/resolutions/ circulars/ standing orders related to medico-legal practice issued by State Government authorities.

1.8.4: Describe the latest decisions/notifications/resolutions/ circulars/ standing orders related to medico-legal practice issued by NMC/MCI/ SMC.

FM2.30 - Have knowledge/awareness of latest decisions/ notifications/ resolutions/ circulars/standing orders related to medico-legal practice issued by Courts/ Government authorities etc

2.30.1: Debate on the latest decisions/notifications/circulars/standing orders related to medico-legal practice issued by Courts.

2.30.2: Debate on the latest decisions/notifications/circulars/standing orders related to medico-legal practice issued by Central Government.

2.30.3: Debate on the latest decisions/notifications/circulars/standing orders related to medico-legal practice issued by State Government.

2.30.4: Debate on the latest decisions/notifications/circulars/standing orders related to medico-legal practice issued by NMC/MCI/ SMC

- **Lecture – 1 hr**

Assessment: Written, Viva voce

FM 1.9 - Describe the importance of documentation in medical practice in regard to medicolegal examinations, Medical certificates & medicolegal reports especially

- Maintenance of patient case records, discharge summary, prescribed registers to be maintained in Health Centres.
- Maintenance of medico-legal register like accident register
- Documents of issuance of wound certificate
- Documents of issuance of drunkenness certificate
- Documents of issuance of sickness & fitness certificate
- Documents of issuance of death certificate
- Documents of issuance of medical certification of cause of death-form no.4, 4A
- Documents of estimation of age by physical, dental & radiological examination & issuance of certificate

1.9.1: Enumerate various medical / medicolegal records to be maintained by hospital/ medical practitioner.

1.9.2: Describe the importance of documentation and maintenance of medical records (out-patient slips, in-patient case details, consent forms, operative & anesthetic notes, discharge/death summary, sickness & fitness certificates, MCCD certificate, etc).

1.9.3: Describe the importance of documentation and maintenance of medicolegal records (MLC register, MTP register, age certificate, wound certificate, drunkenness certificate, sexual violence report, postmortem report, etc).

- **SGD – 1 hr (Practical)**

Assessment: Written / Viva voce / OSCE

FM 1.10 - Select appropriate cause of death in a particular scenario by referring ICD 10 code.

- 1.10.1: Explain the importance of ICD-10 code in certifying the cause of death.
- 1.10.2: Enumerate the important causes of death as per ICD-10.
- 1.10.3: Chose the appropriate cause of death in a particular scenario.

FM 1.11 - Write a correct cause of death certificate as per ICD 10 document

- 1.11.1: Describe the objectives of MCCD certification.
- 1.11.2: Draft the MCCD certificate in a particular scenario as per ICD-10.
- 1.11.3: Explain the procedure of dispatching MCCD certificate to the concerned authorities.

Forensic Pathology

- SGD – 5 hrs Assessment: Written / Viva voce

FM 2.20 - Mechanical asphyxia: Define, classify and describe asphyxia and medico-legal interpretation of post-mortem findings in asphyxial deaths.

- 2.20.1: Define asphyxia.
- 2.20.2: Mention the various types of asphyxial deaths (mechanical, pathological, toxic, environmental, traumatic, postural, iatrogenic).
- 2.20.3: Describe the pathophysiology (vicious cycle) of asphyxia.
- 2.20.4: Explain the types of anoxia/ hypoxia (Gordon's classification).
- 2.20.5: Discuss the classical postmortem findings in asphyxial deaths.

FM 2.21 - Mechanical asphyxia: Describe and discuss different types of hanging and strangulation including clinical findings, causes of death, post-mortem findings and medico-legal aspects of death due to hanging and strangulation including examination, preservation and dispatch of ligature material.

- 2.21.1: Define mechanical asphyxia death.
- 2.21.2: Classify mechanical asphyxial deaths.
- 2.21.3: Define hanging.
- 2.21.4: Enumerate the types of hanging.
- 2.21.5: Explain the symptoms experienced by the victim in hanging.
- 2.21.6: Describe the causes of death, postmortem findings and medicolegal aspects of death due to hanging.
- 2.21.7: Discuss on judicial hanging.
- 2.21.8: Define strangulation.
- 2.21.9: Enumerate the types of strangulation.
- 2.21.10: Describe the causes of death, postmortem findings and medicolegal aspects of death due to ligature strangulation.
- 2.21.11: Describe the causes of death, postmortem findings and medicolegal aspects of death due to manual strangulation.
- 2.21.13: Discuss on Bansdola, Mugging, Garroting,

2.21.14: Describe the examination, preservation and dispatch of ligature material used in hanging and strangulation.

2.21.15: Explain the fractures of hyoid bone.

FM 2.22 - Mechanical asphyxia: Describe and discuss patho-physiology, clinical features, post-mortem findings and medico-legal aspects of traumatic asphyxia, obstruction of nose & mouth, suffocation and sexual asphyxia.

2.22.1: Define traumatic asphyxia.

2.22.2: Describe the pathophysiology, postmortem findings and medicolegal aspects of traumatic asphyxia.

2.22.3: Discuss on postural/positional asphyxia.

2.22.4: Discuss on Overlying.

2.22.5: Define suffocation.

2.22.6: Enumerate the types of suffocation.

2.22.7: Describe the postmortem findings and medicolegal aspects of Environmental asphyxia, Smothering, Gagging and Choking.

2.22.8: Discuss on Café-coronary.

2.22.9: Discuss on Burking.

2.22.10: Describe methods used, postmortem findings and medicolegal aspects of Sexual/ Auto-erotic asphyxia.

FM 2.23 - Mechanical asphyxia: Describe and discuss types, patho-physiology, clinical features, post-mortem findings and medico-legal aspects of drowning, diatom test and gettler test.

2.23.1: Define drowning.

2.23.2: Explain the mechanism of drowning.

2.23.3: Enumerate the types of drowning.

2.23.4: Describe the pathophysiology, causes of death, postmortem findings and medicolegal aspects of drowning.

2.23.5: Describe the clinical features and treatment of Post-immersion syndrome (Near drowning).

2.23.6: Discuss on Diatom test and its medicolegal importance.

2.23.7: Discuss on Gettler test and its medicolegal importance.

- **SGD – 1 hr**

Assessment: Written / Viva voce

FM 2.24 - Thermal deaths: Describe the clinical features, post-mortem finding and medicolegal aspects of injuries due to physical agents like heat (heat-hyper-pyrexia, heat stroke, sun stroke, heat exhaustion/ prostration, heat cramps [miner's cramp] or cold (systemic and localized hypothermia, frostbite, trench foot, immersion foot)

2.24.1: Classify thermal injuries.

2.24.2: Describe the local (frostbite, trench foot, immersion foot) and general effects (hypothermia) due to Cold.

2.24.3: Describe the postmortem findings and medicolegal aspects of deaths due to Hypothermia.

2.24.4: Describe the general effects due to Heat (heat cramps, heat exhaustion/prostration, heat hyperpyrexia/heat stroke/ sunstroke).

2.24.5: Describe the postmortem findings and medicolegal aspects of deaths due to Heat stroke.

- **SGD – 1 hr**

Assessment: Written / Viva voce / OSPE

FM 2.25 - Describe types of injuries, clinical features, patho-physiology, postmortem findings and medico-legal aspects in cases of burns, scalds, lightening, electrocution and radiations.

2.25.1: Define Burn.

2.25.2: Enumerate the types or causes of burns.

2.25.3: Describe the degree of burns (Dupuytren's, Wilson's and Clinical classification).

2.25.4: Explain the method of calculation of percentage of burns (Rule of Nine/Wallace, Lund and Browder chart).

2.25.5: Describe the clinical features, management, causes of death, postmortem findings and medicolegal aspects of Dry burns and Scalds.

2.25.6: Differentiate between antemortem and postmortem burns.

2.25.7: Describe the factors affecting the electrical injuries.

2.25.8: Describe the postmortem findings, causes of death and medicolegal aspects in deaths due to electrocution.

2.25.9: Describe the factors affecting the lightening injuries.

2.25.10: Describe the postmortem findings, causes of death and medicolegal aspects in deaths due to lightening.

2.25.11 Discuss on injuries caused by exposure to radiation

- **Lecture – 1 hr**

Assessment: Written, Viva voce

FM 2.26 - Describe and discuss clinical features, post-mortem findings and medico-legal aspects of death due to starvation and neglect

2.26.1: Explain the meaning of starvation.

2.26.2: Enumerate the types of starvation.

2.26.3: Enumerate the causes of starvation.

2.26.4: Describe the factors modifying the effects of starvation.

2.26.5: Describe the clinical features, management, causes of death, postmortem findings and medicolegal aspects of starvation.

- **SGD – 3 hrs**
Practical record

Assessment: Written / Viva voce / OSPE / log book /

FM 2.27 - Define and discuss infanticide, foeticide and stillbirth

2.27.1: Define Foeticide, Neonaticide and infanticide.

2.27.2: Define dead birth, still birth and live birth.

2.27.3: Discuss on medicolegal aspects of infanticide

FM 2.28 - Describe and discuss signs of intrauterine death, signs of live birth, viability of foetus, age determination of foetus, DOAP session of ossification centres, Hydrostatic test, Sudden Infant Death syndrome. Munchausen's syndrome by proxy. [Munchausen's syndrome by proxy is covered in FM 3.29]

- 2.28.1: Describe the causes of Intra Uterine Death (IUD).
- 2.28.2: Describe the features of 'Dead born foetus'.
- 2.28.3: Define 'Viability of foetus' and its medicolegal importance.
- 2.28.4: Describe the method of estimation of gestational age of foetus.
- 2.28.5: Describe the signs of 'Live birth'.
- 2.28.6: Describe the causes of infant death.
- 2.28.7: Define Sudden Infant Death Syndrome (SIDS).
- 2.28.8: Describe causes, postmortem findings & medicolegal aspects of SIDS

FM14.13 - To estimate the age of foetus by post-mortem examination

- 14.13.1: Enumerate the objectives of foetal autopsy.
- 14.13.2: Describe the procedure of foetal autopsy.
- 14.13.3: Estimate the age of foetus by examination of ossification centres, anthropometric measurements, blood constituents, hair, nail, umbilical cord etc.
- 14.13.4: Draft a medicolegal report and opinion after foetal autopsy.

Clinical Forensic Medicine

• **SGD – 4 hrs**

Assessment: Written, Viva voce, OSCE

FM 3.3 - Mechanical injuries and wounds: Define, describe and classify different types of mechanical injuries, abrasion, bruise, laceration, stab wound, incised wound, chop wound, defense wound, self-inflicted/ fabricated wounds and their medico-legal aspects.

- 3.3.1: Define mechanical injury.
- 3.3.2: Classify mechanical injuries.
- 3.3.3: Define abrasion.
- 3.3.4: Describe the characteristic features, types and medicolegal aspects of an abrasion
- 3.3.5: Define contusion.
- 3.3.6: Describe the characteristic features, types and medicolegal aspects of contusion.
- 3.3.7: Describe the factors influencing the formation of contusion.
- 3.3.8: Define laceration.
- 3.3.9: Describe the characteristic features, types and medicolegal aspects of a laceration.
- 3.3.10: Define an incised wound.
- 3.3.11: Describe the characteristic features, types and medicolegal aspects of an incised wound.
- 3.3.12: Define chop wound.

- 3.3.13: Describe the characteristic features and medicolegal aspects of chop wound.
- 3.3.14: Define stab wound.
- 3.3.15: Describe the characteristic features, types and medicolegal aspects of stab wound.
- 3.3.16: Define defense wound.
- 3.3.17: Describe the characteristic features and medicolegal importance of defense wound.
- 3.3.18: Define fabricated wound.
- 3.3.19: Describe the characteristic features and medicolegal importance of fabricated wound.

- **Lecture – 2 hrs**

Assessment: Written, Viva voce

FM 3.4 - Define injury, assault & hurt. Describe IPC pertaining to injuries

- 3.4.1: Define injury (S. 44 IPC), assault (S. 351 IPC) and hurt (S. 319 IPC).
- 3.4.2: Define homicide.
- 3.4.3: Describe the types of homicide.
- 3.4.4: Describe Grievous hurt (S. 320 IPC).
- 3.4.5: Understand the IPC sections pertaining to injuries (Sec. 44, 299, 300, 302, 304, 304-A, 304-B, 306, 307, 319, 320, 321-326, 351, 354, 497, 498-A).

FM 3.5 - Describe accidental, suicidal and homicidal injuries. Describe simple, grievous and dangerous injuries. Describe ante-mortem and post-mortem injuries.

- 3.5.1: Define medico-legal case (MLC) with examples.
- 3.5.2: Differentiate between the accidental, suicidal and homicidal injuries with examples.
- 3.5.3: Describe simple and grievous hurt.
- 3.5.4: Explain the difference between the injuries that are likely to cause death, sufficient in the ordinary course of nature to cause death and imminently dangerous.
- 3.5.5: Describe the difference between ante-mortem and post-mortem wounds.

FM 3.6 - Describe healing of injury and fracture of bones with its medico-legal importance

- 3.6.1: Describe wound healing by primary and secondary intention and its medicolegal importance.
- 3.6.2: Enumerate the types of fracture.
- 3.6.3: Describe the healing of a fracture and its medicolegal importance.
- 3.6.4: Describe the difference between ante-mortem and post-mortem fracture.

FM 3.7 - Describe factors influencing infliction of injuries and healing, examination and certification of wounds and wound as a cause of death: Primary and Secondary (along with FM 14.1)

- 3.7.1: Describe the factors influencing the causation of an injury.

3.7.2: Describe the factors that influence healing of an injury or fracture.

3.7.3: Discuss the primary and secondary causes of death from a wound.

FM 3.8 - Describe and discuss different types of weapons including dangerous weapons and their examination

3.8.1: Identify the weapons that cause blunt force and sharp force injuries.

3.8.2: Define dangerous weapon (S. 324 IPC and 326 IPC).

- **SGD – 3 hrs**

Assessment: Written, Viva voce, OSCE

FM 3.9 - Firearm injuries: Describe different types of firearms including structure and components. Along with description of ammunition propellant charge and mechanism of fire-arms, different types of cartridges and bullets and various terminology in relation of firearm – caliber, range, choking

3.9.1: Define Forensic ballistics, Proximal ballistics, Intermediate ballistics, and Terminal ballistics.

3.9.2: Define firearm.

3.9.3: Classify firearms.

3.9.4: Enumerate the parts of the basic firearms.

3.9.5: Explain 'rifling' and 'calibre' of a firearm.

3.9.6: Explain 'choking' in a firearm and its purpose.

3.9.7: Enumerate the components of rifled firearm and shotgun cartridge, and its function.

3.9.8: Describe the types of gunpowder.

3.9.9: Discuss on types of bullets and pellets.

FM 3.10 - Describe and discuss wound ballistics-different types of firearm injuries, blast injuries and their interpretation, preservation and dispatch of trace evidences in cases of firearm and blast injuries, various tests related to confirmation of use of firearms

3.10.1: Define wound ballistics.

3.10.2: Enumerate the factors affecting gunshot wound production.

3.10.3: Explain the mechanism of firing and various components of discharge of firing.

3.10.4: Describe the entry and exit wounds from a rifled firearm at various ranges.

3.10.5: Describe the entry and exit wounds from a shotgun at various ranges.

3.10.6: Discuss on Ricocheting of a bullet and its effect.

3.10.7: Discuss on Tumbling bullet, Yawning bullet, Dumdum bullet, Tandem bullet, Souvenir bullet.

3.10.8: List the evidentiary materials to be collected in gunshot wounds.

- 3.10.9: Describe the method of collection and preservation of evidentiary materials in gunshot wounds.
- 3.10.10: Describe the significance of bullet markings and use of comparison microscope.
- 3.10.11: Enumerate the tests done for detection of gunshot residue.
- 3.10.12: Describe the injuries caused by bomb blast / explosion

- **SGD – 4 hrs**
OSPE

Assessment: Written, Viva voce, OSCE /

FM 3.11 - Regional injuries: Describe and discuss regional injuries to head (Scalp wounds, fracture skull, intracranial haemorrhages, coup and contrecoup injuries), neck, chest, abdomen, limbs, genital organs, spinal cord and skeleton

- 3.11.1: Define head injury.
- 3.11.2: Discuss the forensic anatomy of scalp and scalp injuries.
- 3.11.3: Enumerate the types of skull fracture.
- 3.11.4: Describe the intracranial hemorrhages and its medicolegal aspects.
- 3.11.5: Describe the cerebral injuries and its medicolegal aspects.
- 3.11.6: Explain 'concussion of brain' and 'diffuse axonal injury'.
- 3.11.7: Discuss on 'Punch drunk syndrome'.
- 3.11.8: Describe the mechanism, clinical features and medicolegal aspects of whiplash injury.
- 3.11.9: Discuss on 'railway spine'.
- 3.11.10: Discuss on injuries to chest, abdomen and genital organs

FM 3.12 - Describe and discuss injuries related to fall from height and vehicular injuries – Primary and Secondary impact, Secondary injuries, crush syndrome, railway spine

- 3.12.1: Describe the injuries sustained to person in a fall from height.
- 3.12.2: Describe the injuries to a pedestrian in vehicular accident (primary impact, second impact and secondary injuries).
- 3.12.3: Describe the injuries to driver, front seat passenger and back seat passenger of a motor car.
- 3.12.4: Discuss on 'Crush syndrome'.

- **SGD – 2 hrs (Practical)**
station / Viva voce, OSCE

Assessment: Log book / Skill

FM14.1 - Examine and prepare Medico-legal report of an injured person with different etiologies in a simulated/ supervised environment

14.1.1: Take an informed consent from the Patient / Guardian after explaining the importance of MLC registration in Medicolegal cases (Road traffic accident / Fall from height / Assault / Self infliction of injuries / Burns / Firearms).

14.1.2: Perform the clinical examination of an injured person (history taking, general physical examination, systemic examination, laboratory investigations) in a simulated/ supervised environment.

14.1.3: Prepare the wound certificate after documenting the clinical findings.

14.1.4: Prepare the police intimation.

- **SGD – 1 hr (Practical)**

Assessment: Log book /

Practical record / Viva voce, OSPE

FM14.10 - Demonstrate ability to identify & prepare medicolegal inference from specimens obtained from various types of injuries e.g. contusion, abrasion, laceration, firearm wounds, burns, head injury and fracture of bone

14.10.1: Prepare a medicolegal inference from **photographs** showing various types of injuries/ lesions/ postmortem findings.

14.10.2: Prepare a medicolegal inference from **wet specimens** showing various types of injuries/ lesions/ postmortem findings.

14.10.3: Prepare medicolegal inference from **models** showing various types of injuries/ lesions/ postmortem findings.

- **Lecture – 2 hrs**

Assessment: Written, Viva voce

FM3.18 – Describe legitimacy and its medicolegal importance, how 'signs' of virginity are unscientific, inhuman and discriminatory, how to appraise the courts about unscientific basis of these tests if court orders it.

3.18.1: Describe legitimacy and its medicolegal importance.

3.18.2: Describe and discuss how 'signs' of virginity (so called 'virginity test', including finger tests on female genitalia) are unscientific, inhuman and discriminatory.

3.18.3: Describe and discuss how to appraise the courts about unscientific basis of these tests if court orders it.

FM3.19 - Discuss the medicolegal aspects of pregnancy and delivery, signs of pregnancy, precipitate labour, superfoetation, superfecundation, and signs of recent and remote delivery in living and dead

3.19.1: Describe the presumptive, probable and positive signs of pregnancy.

3.19.2: Describe pseudocyesis.

3.19.3: Define superfoetation and superfecundation.

3.19.4: Describe the medicolegal aspects of pregnancy.

3.19.5: Define delivery.

3.19.6: Describe the signs of recent and remote delivery in a living individual.

3.19.7: Enumerate the signs of recent & remote delivery in a dead individual.

3.19.8. Mention the medicolegal aspects of delivery.

3.19.9: Define precipitate labour.

3.19.10: Describe the signs and medicolegal aspects of precipitate labour.

FM3.20 - Discuss disputed paternity and maternity

3.20.1: Discuss the medicolegal issues related to disputed paternity and maternity.

3.20.2: Describe the method of identifying paternalism and maternalism.

- **Lecture – 2 hrs**

Assessment: Written, Viva voce

FM3.22 - Define and discuss impotence, sterility, frigidity, sexual dysfunction, premature ejaculation. Discuss the causes of impotence and sterility in male and female

3.22.1: Define impotence, sterility, frigidity, sexual/erectile dysfunction and premature ejaculation.

3.22.2: List the causes of impotence in male and female.

3.22.3: Describe the medicolegal issues related to impotence, sexual/erectile dysfunction and premature ejaculation.

3.22.4: List the causes of sterility in male and female.

3.22.5: Describe the medicolegal issues related to sterility.

3.22.6: Describe procedure of examination in alleged case of impotency.

FM3.23 - Discuss Sterilization of male and female, artificial insemination, Test Tube Baby, surrogate mother, hormonal replacement therapy with respect to appropriate national and state laws

3.23.1: Describe the methods of sterilization in male and female.

3.23.2: Discuss the medicolegal issues related to sterilization procedure.

3.23.3: Define artificial insemination.

3.23.4: Mention the types of artificial insemination.

3.23.5: Enumerate the indications for artificial insemination.

3.23.6: Discuss ethical issues and precautions to be taken during the artificial insemination.

3.23.7: Describe medicolegal issues related to artificial insemination.

3.23.8: Discuss on invitro fertilization/ test tube baby and surrogate motherhood.

FM3.26 - Discuss the national Guidelines for accreditation, supervision & regulation of ART Clinics in India

3.26.1: Discuss the National Guidelines for accreditation, supervision & regulation of ART Clinics in India.

3.26.2: Explain the recent updates on laws related to ART and Surrogacy.

- **SDL – 1 hr**

Assessment: Written, Viva voce

FM3.21 - Discuss Pre-conception and Pre Natal Diagnostic Techniques (PC&PNDT) - Prohibition of Sex Selection Act 2003 and Domestic Violence Act 2005

3.21.1: Describe the objectives of PCPNDT Act, 1994.

3.21.2: Enumerate the indications for prenatal diagnostic procedures.

3.21.3: List the various prenatal diagnostic techniques.

3.21.4: Describe the guidelines for establishing and maintaining the centres to practice prenatal diagnostic procedures.

3.21.5: Describe the punishment for offences under PCPNDT Act.

3.21.6: Discuss on amendments to the PCPNDT Act till date.

3.21.7: Define domestic violence.

3.21.8: Describe the salient features of The Protection of Women from Domestic Violence Act, 2005.

3.21.9: Explain the medicolegal responsibilities of a medical practitioner in a domestic violence case.

FM3.24 - Discuss the relative importance of surgical methods of contraception (vasectomy and tubectomy) as methods of contraception in the National Family Planning Programme

3.24.1: Describe the salient features of the National Family Planning Programme related to vasectomy and tubectomy.

FM3.25 - Discuss the major results of the National Family Health Survey

3.25.1: Discuss the major results of National Family Health Survey (NFHS).

- **Lecture – 1 hr**

Assessment: Written, Viva voce, OSPE / OSCE

FM 3.13 – Describe various sections of IPC & CrPC related to definition of rape and sexual assault, medical examination of rape victim and accused of rape, police information by the doctors and medical care with recent amendments notified till date, the relevant provisions of POCSO act

3.13.1: Describe various sections of IPC & CrPC related to definition of rape and sexual assault, medical examination of rape victim and accused of rape, police information by the doctors and medical care with recent amendments notified till date (i.e., Section 375 IPC, 166 B IPC, 357 C & 164 A, 53 A of CrPC).

3.13.2: Describe the relevant provisions of POCSO act related to medical examination, emergency medical care and police information.

- **Lecture – 1 hr**

Assessment: Written, Viva voce, OSCE

FM 3.14 - Describe and discuss the examination of the victim of an alleged case of rape, and the preparation of report, framing the opinion and preservation and dispatch of trace evidences in such cases.

3.14.1: Describe the findings in a victim of sexual violence.

3.14.2: Describe the duties of doctor towards victim of sexual violence.

3.14.3: Understand the legal sections related to examination of a victim of sexual violence (164-A CrPC, 327 CrPC, 357-C CrPC, 228-A IPC, 114-A IEA, 146 IEA).

3.14.4: Describe the procedure of examination, contents of the format, guidelines for preliminary and final opinion in a victim of sexual violence (given by Ministry of Health and Family welfare, Government of India).

3.14.5: Describe the procedure of collecting, preservation and dispatch of evidentiary materials from a victim of sexual violence.

3.14.6: Understand the significance of SAFE kit in collecting evidentiary material from a victim of sexual assault.

SGD – 3 hrs

Assessment: Written, Viva voce, OSCE

FM 3.15 - Describe and discuss examination of accused and victim of sodomy, preparation of report, framing of opinion, preservation and despatch of trace evidences in such cases.

3.15.1: Define sodomy.

3.15.2: Describe the findings in a victim of sodomy.

3.15.3: Describe the procedure of examination, contents of the format, and guidelines for opinion in a victim of sodomy.

3.15.4: Describe the procedure of collecting, preservation and dispatch of evidentiary materials from a victim of sodomy.

3.15.5: Describe the findings in an accused of sexual assault.

3.15.6: Describe the procedure of examination, contents of the format, and guidelines for opinion in an accused of sexual assault.

3.15.7: Understand the recent amendments in section 377 IPC.

FM 3.16 – Describe and discuss informed consent in sexual intercourse, histories of gender and sexuality- based (sexual orientation) identities and rights in India, history of decriminalisation of 'adultery' and consensual adult homosexual sexual behavior, sexual offences with its medicolegal significance.

3.16.1: Describe and discuss informed consent in sexual intercourse.

3.16.2: Describe and discuss histories of gender and sexuality- based (sexual orientation) identities and rights in India.

3.16.3: Describe history of decriminalisation of 'adultery' and consensual adult homosexual sexual behaviour.

3.16.4: Describe sexual offences with its medicolegal significance-

- forced/non-consensual penetrative anal Sex
- forced/non-consensual oral sex
- sexual acts with animals/ bestiality/ Zoophilia
- forced/non-consensual insertion of fingers or objects
- forced/non-consensual touching or groping or disrobing ('indecent assault').

FM 3.17 – Describe the difference between Paraphilia and Paraphilic disorder, paraphilic disorder as per as per the latest guidelines of DSM & ICD, medicolegal implications, the various paraphilias in the context of informed consent during any sexual interaction.

3.17.1: Describe the difference between Paraphilia and Paraphilic disorder.

3.17.2: Describe paraphilic disorder as per as per the latest guidelines of DSM & ICD and describe medico-legal implications of paraphilic disorder by referring scientific literature and legal justification (if any).

3.17.3: Describe and discuss the various paraphilias in the context of informed consent during any sexual interaction.

SGD – 1 hr (Practical)

Assessment: Practical record, log book, Viva voce,

OSCE

FM14.15 - To examine & prepare medico-legal report of a victim of sexual offence/ unnatural sexual offence in a simulated/ supervised environment

14.15.1: Take an informed consent for examination of a victim of sexual offence.

14.15.2: Describe the procedure of examination and collection of evidentiary material for medical and medicolegal purposes.

14.15.3: Prepare a medicolegal report and opinion in a victim of sexual offence.

14.15.4: Explain the procedure of handing over the evidentiary material to the investigating officer.

SGD – 1 hr (Practical)

Assessment: Practical record, log book, Viva voce,

OSCE

FM14.14 - To examine & prepare report of an alleged accused in rape/ unnatural sexual offence in a simulated/ supervised environment

14.14.1: Take an informed consent for examination of an accused of sexual offence.

14.14.2: Describe the procedure of examination and collection of evidentiary material for medical and medicolegal purposes.

14.14.3: Prepare a medicolegal report and opinion in an alleged accused of sexual offence.

14.14.4: Explain the procedure of handing over the evidentiary material to the investigating officer

- **Lecture – 2 hrs**

Assessment: Written, Viva voce, OSCE

FM3.27 - Define, classify and discuss abortion, methods of procuring MTP and criminal abortion and complication of abortion. MTP Act 1971

3.27.1: Define abortion.

3.27.2: Classify abortion.

3.27.3: Describe the methods used for therapeutic abortion.

3.27.4: Describe the methods used for criminal abortion & its complications.

3.27.5: Discuss the Medical termination of Pregnancy Act, 1971 and its amendments.

FM3.28 - Describe evidences of abortion - living and dead, duties of doctor in cases of abortion, investigations of death due to criminal abortion

3.28.1: Describe evidences of abortion in living and dead individual.

3.28.2: Explain the circumstances under which a case of abortion is brought to the notice of medical officer.

3.28.3: Describe the medical and legal duties of doctor in a case of criminal abortion.

3.28.4: Describe the examination, method of collection, preservation and dispatch of evidentiary materials during investigation of death of woman in criminal abortion.

- **Lecture – 1 hr**

Assessment: Written, Viva voce, OSCE

FM3.29 - Describe and discuss child abuse and battered baby syndrome

3.29.1: Define child abuse or child maltreatment (as per WHO).

3.29.2: Enumerate different forms of child abuse.

3.29.3: Define battered baby syndrome.

3.29.4: Describe the clinical findings and medicolegal aspects of battered baby syndrome.

3.29.5: Discuss on Shaken baby syndrome and Cinderella syndrome.

3.29.6: Discuss on Munchausen's Syndrome by proxy.

3.29.7: Describe the medicolegal responsibilities of a doctor in child abuse cases.

SDL – 1 hr

Assessment: Written, Viva voce, OSCE

FM3.30 - Describe and discuss issues relating to torture, identification of injuries caused by torture and its sequelae, management of torture survivors

3.30.1: Define Torture (as per UN Convention of Torture, World Medical Association).

3.30.2: Enumerate the types/methods/techniques used for torture.

3.30.3: Explain the medical findings in a case of torture.

3.30.4: Outline the management of torture survivors.

3.30.5: Discuss the ethical and legal issues related to torture.

FM3.31 - Torture and Human rights- Describe and discuss guidelines and Protocols of National Human Rights Commission regarding torture

3.31.1: Describe the guidelines and protocols of National human rights commission in cases of torture.

SGD – 2 hrs

Assessment: Practical record, Log book, Viva voce, OSCE

FM3.32 - Demonstrate the professionalism while preparing reports in medico-legal situations, interpretation of findings and making inference/opinion, collection preservation and dispatch of biological or trace evidences

3.32.1: Demonstrate the professionalism to be shown by a doctor while preparing reports in medicolegal cases, interpretation of findings and making inference/opinion.

3.32.2: Demonstrate the professionalism to be shown by a doctor during the collection, preservation and dispatch of biological or trace evidences.

FM3.33 - Should be able to demonstrate the professionalism while dealing with victims of torture and human right violations, sexual assaults psychological consultation, rehabilitation

3.33.1: Demonstrate the professionalism to be shown by a doctor while dealing with victims of torture and human right violations.

3.33.2: Demonstrate the professionalism to be shown by a doctor during the examination, psychological consultation and rehabilitation of sexual victims

FM14.18 - To examine & prepare medico-legal report of a person in police, judicial custody or referred by Court of Law and violation of human rights as requirement of NHRC, who has been brought for medical examination

14.18.1: Explain the procedure of examination and preparing the medico-legal report of a person in police custody/ judicial custody who has been brought for medical examination.

14.18.2: Explain the procedure of examination and preparing the medico-legal report of a person referred by Court of Law for medical examination.

14.18.3: Explain the procedure of examination and preparing the medico-legal report of a person with history of violation of human rights as per requirement of NHRC (victim of torture, hunger strike, etc), who has been brought for medical examination.

Medical Jurisprudence (Medical Law and ethics)

- **Lecture – 3 hrs**

Assessment: Written, Viva voce, OSCE

FM4.1 - Describe Medical Ethics and explain its historical emergence

4.1.1: Define Ethics and Medical ethics.

4.1.2: Describe the historical emergence of Medical ethics.

4.1.3: Discuss the need for and the emergence of World Medical Association's Declaration of Helsinki 1964 and its subsequent revisions.

FM4.2 - Describe the Code of Medical Ethics 2002 conduct, Etiquette and Ethics in medical practice and unethical practices & the dichotomy

4.2.1: Describe the 'Code of medical ethics' as per Indian Medical Council (Professional conduct, Etiquette and Ethics) Regulations, 2002.

4.2.2: Enumerate the various practices of a medical practitioner which are considered as unethical.

4.2.3: Explain the meaning of Dichotomy with examples.

4.2.4: Mention guidelines laid down by MCI with respect to remuneration

FM4.3 - Describe the functions and role of Medical Council of India / National Medical Commission and State Medical Councils

4.3.1: Describe the constitution and functions of Medical Council of India/ National Medical Council.

4.3.2: Describe the constitution and functions of State Medical Council.

FM4.4 - Describe the Indian Medical Register

4.4.1: List the various particulars to be entered in Indian Medical Register (IMR).

4.4.2: Mention under which schedules, the degrees obtained by institutions in and outside India are recognized by MCI.

4.4.3: Describe the procedure for a foreign medical practitioner to get enrolled in IMR.

4.4.4: Mention the advantages to a Doctor after enrolling in IMR.

FM4.5 - Rights/privileges of a medical practitioner, penal erasure, infamous conduct, disciplinary Committee, disciplinary procedures, warning notice and penal erasure

4.5.1: Enumerate the Rights/privileges of a medical practitioner

4.5.2: Define Infamous conduct/Professional misconduct with suitable examples (as per IMC regulations, 2002)

4.5.3: Describe the composition of disciplinary committee and its procedure in dealing with cases of infamous conduct.

4.5.4: Discuss the various punishments awarded by disciplinary committee for infamous conduct (warning notice, temporary erasure, penal erasure).

FM4.6 - Describe the Laws in Relation to medical practice and the duties of a medical practitioner towards patients and society

4.6.1: Enumerate the laws related to medical practice in India.

4.6.2: Describe the 'Duties of a medical practitioner' in general towards his patient, society and research.

- **Lecture – 1 hr**

Assessment: Written, Viva voce, OSCE

FM4.7 - Describe and discuss the ethics related to HIV patients

4.7.1: Describe legal and ethical issues in HIV testing.

4.7.2: Mention the rights of HIV positive patients.

4.7.3: Discuss the duties of a Doctor while treating HIV patients with respect to confidentiality & disclosure.

4.7.4: Discuss the current policies related to the research and health care of HIV positive patients.

FM4.12 - Discuss legal and ethical issues in relation to stem cell research

4.12.1: Enumerate the application of stem cells in research and therapy.

4.12.2: Discuss the ethical issues arising from stem cell research and therapy.

4.12.3: Discuss the legal status of stem cell therapy and research in India.

4.12.4: Describe the guidelines for stem cell research in India.

FM4.13 - Describe social aspects of Medico-legal cases with respect to victims of assault, rape, attempted suicide, homicide, domestic violence, dowry- related cases

4.13.1: Describe the social aspects and role of medical professionals with respect to victim of sexual violence.

4.13.2: Describe the social aspects and role of medical professionals with respect to victim of attempted suicide.

4.13.3: Describe the social aspects and role of medical professionals with respect to victim of attempted homicide.

4.13.4: Describe the social aspects and role of medical professionals with respect to victim of domestic violence.

- **Lecture – 1 hr**

Assessment: Written, Viva voce, OSCE

FM4.8 - Describe the Consumer Protection Act-1986 (Medical Indemnity Insurance, Civil Litigations and Compensations), Workman's Compensation Act & ESI Act

4.8.1: Discuss on Consumer Protection Act-1986 & 2019 in view of medical services with latest amendments.

4.8.2: Describe the purpose of Medical Indemnity Insurance in civil litigations and compensations.

4.8.3: Discuss the role of a doctor in awarding compensation to workers or their dependents as per Workman's Compensation Act and ESI Act.

SGD – 1 hr

Assessment: Practical record, Log book, Viva voce, OSCE

FM4.9 - Describe the medico - legal issues in relation to family violence, violation of human rights, NHRC and doctors

4.9.1: Define Domestic Violence.

4.9.2: Discuss the salient features of "Protection of women from domestic violence Act, 2005" in relation to medical and legal responsibilities of a medical practitioner.

4.9.3: Enumerate the cases related to violation of human rights.

4.9.4: Discuss the responsibilities of a doctor in cases of violation of human rights.

FM4.10 - Describe communication between doctors, public and media

4.10.1: Describe the communication skills by a doctor with the public and its importance.

4.10.2: Describe the communication skills and precautions to be taken by a doctor while interacting with the media.

4.10.3: Describe communication skills by a doctor with his/her colleagues

FM4.14 - Describe & discuss the challenges in managing medico-legal cases including development of skills in relationship management – Human behaviour, communication skills, conflict resolution techniques

4.14.1: Discuss the challenges in managing the medico legal cases.

4.14.2: Describe the principles of doctor-patient relationship management.

4.14.3: Describe the development of human behavior and communication skills required for managing doctor-patient relationship.

4.14.4: Discuss the conflict resolution techniques in managing medico-legal cases.

FM4.15 - Describe the principles of handling pressure – definition, types, causes, sources and skills for managing the pressure while dealing with medico-legal cases by the doctor

4.15.1: Define stress.

4.15.2: Mention the types of pressure while dealing with medico-legal cases by a doctor.

4.15.3: List the causes/ sources of pressure in handling medico-legal cases.

4.15.4: Discuss the skills needed for managing the pressure situations in handling a medico-legal case.

• **Lecture – 1 hr**

Assessment: Written, Viva voce

FM4.16 - Describe and discuss Bioethics

4.16.1: Define bioethics.

4.16.2: Enumerate the issues in medical practice wherein bioethics is applied.

4.16.3: Mention the four main principles of bioethics.

4.16.4: Discuss the medico-legal issues related to bioethics in patient care.

FM4.17 - Describe and discuss ethical Principles: Respect for autonomy, non-maleficence, beneficence & justice

4.17.1: Describe respect for patient's autonomy.

4.17.2: Describe the role of beneficence as a guiding principle in patient care.

4.17.3: Describe the role of non-maleficence as a guiding principle in patient care.

4.17.4: Discuss the application of justice in distributing resources and benefits in medical practice and research.

FM4.11 - Describe and discuss euthanasia

4.11.1: Define euthanasia.

4.11.2: Describe various types of euthanasia.

4.11.3: Debate around euthanasia- the arguments against and in favour.

- 4.11.4: Mention the legal status of euthanasia in India and in other countries.
- 4.11.5: Discuss the landmark case of Aruna Shanbaug and its impact on the status of euthanasia in India.

SGD – 3 hrs

Assessment: Written, Viva voce

FM4.18 - Describe and discuss medical negligence including civil and criminal negligence, contributory negligence, corporate negligence, vicarious liability, Res Ipsa Loquitur, prevention of medical negligence and defenses in medical negligence litigations

- 4.18.1: Define medical negligence.
- 4.18.2: Describe the elements of medical negligence.
- 4.18.3: Describe civil and criminal negligence with examples.
- 4.18.4: Describe contributory negligence with examples.
- 4.18.5: Describe the importance of Vicarious liability in medical practice.
- 4.18.6: Describe Corporate Negligence with examples.
- 4.18.7: Describe Res Ipsa Loquitur with examples.
- 4.18.8: Mention the precautionary measures to be taken to avoid medical negligence.
- 4.18.9: Describe the various defenses for a doctor in medical negligence (including Contributory negligence, Therapeutic misadventure, Medical maloccurrence, Calculated risk doctrine, Novus actus interveniens, Res judicata etc).

FM4.19 - Define Consent. Describe different types of consent and ingredients of informed consent. Describe the rules of consent and importance of consent in relation to age, emergency situation, mental illness and alcohol intoxication

- 4.19.1: Define consent.
- 4.19.2: Describe the different types of consent with suitable examples.
- 4.19.3: Describe the ingredients of an informed consent.
- 4.19.4: Describe the rules and regulations associated with consent.
- 4.19.5: Explain the importance of consent in relation to age, emergency situation, mental illness and alcohol intoxication (with relevant sections of IPC).

FM4.20 - Describe therapeutic privilege, Malingering, Therapeutic Misadventure, Professional Secrecy, Human Experimentation

- 4.20.1: Explain the concept of 'therapeutic privilege' in medical practice.
- 4.20.2: Discuss the legal aspects of Malingering during medical practice.

FM4.21 - Describe Products liability and Medical Indemnity Insurance

- 4.21.1: Discuss about 'product liability' in medical negligence.
- 4.21.2: Describe medical indemnity insurance and its purpose.

FM4.24 - Enumerate rights, privileges and duties of a Registered Medical Practitioner. Discuss doctor-patient relationship: professional secrecy and privileged communication

- 4.24.1: Enumerate the rights and privileges of Registered Medical Practitioner.
- 4.24.2: Describe the duties of a Registered Medical Practitioner.

- 4.24.3: Discuss on doctor-patient relationship in clinical practice.
- 4.24.4: Explain professional secrecy with examples.
- 4.24.5: Describe Privileged communication with examples.

FM4.22 - Explain Oath – Hippocrates, Charaka and Sushruta and procedure for administration of Oath

- 4.22.1: Explain oath as described by Hippocrates, Charaka and Sushruta.
- 4.22.3: Describe the procedure for administration of oath for a medical practitioner.

FM4.23 - Describe the modified Declaration of Geneva and its relevance

- 4.23.1: Describe the components of declaration of Geneva.
- 4.23.2: Describe the components of modified declaration of Geneva.
- 4.23.3: Explain the relevance of Declaration of Geneva in the medical profession.

FM4.25 - Clinical research & Ethics - Discuss human experimentation including clinical trials

- 4.25.1: Enumerate the need and drawbacks of different types of clinical research on humans.
- 4.25.2: Describe the phases of clinical trials and its implications.
- 4.25.3: Describe the ethical regulations and guidelines for clinical research.
- 4.25.4: Discuss the principles pertaining to human experimentation in Nuremberg code and Belmont report.
- 4.25.5: Discuss the steps to be taken for protection of vulnerable population in clinical trials/research

FM4.26 - Discuss the constitution and functions of ethical committees

- 4.26.1: List the composition of Institutional Ethics Committee (IEC).
- 4.26.2: Mention the responsibilities and duties of IEC.
- 4.26.3: Describe the proposals that are required to be presented before IEC.
- 4.26.4: Discuss limitations of IEC.

FM4.27 - Describe and discuss Ethical Guidelines for Biomedical Research on Human Subjects & Animals

- 4.27.1: Describe the international and national ethics guidelines for human and animal research.
- 4.27.2: Discuss the principles of ICMR guidelines for research involving human participants.
- 4.27.3: Discuss the rights of human research participants.
- 4.27.4: Discuss the 5 R's (replace, reduce, refine, reuse, and rehabilitate) of animal research ethics.

SGD – 1 hr

Assessment: OSPE, Viva voce

FM4.28 - Demonstrate respect to laws relating to medical practice and Ethical code of conduct prescribed by Medical Council of India and rules and regulations prescribed by it from time to time

- 4.28.1: Demonstrate the conduct of doctor with patients as per the Code of Medical Ethics prescribed by IMC.

FM4.29 - Demonstrate ability to communicate appropriately with media, public and doctors

- 4.29.1: Demonstrate the skills of communication by a doctor with the public.
- 4.29.2: Demonstrate the skills of communication by a doctor with the media.
- 4.29.3: Demonstrate the skills of communication by a doctor with his/her colleagues.

FM4.30 - Demonstrate ability to conduct research in pursuance to guidelines or research ethics

- 4.30.1: Prepare a research protocol for a study as per the ICMR guidelines.
4.30.2: Demonstrate the procedure of taking informed consent for conducting a research.

Forensic Psychiatry

- **Lecture – 1 hr** [Assessment:](#) Written, Viva voce

FM5.1 - Classify common mental illnesses including post-traumatic stress disorder (PTSD)

- 5.1.1: Define Forensic Psychiatry.
5.1.2: Define mental illness.
5.1.3: Classify common mental illnesses.
5.1.4: Explain PTSD with examples.

FM5.2 - Define, classify and describe delusions, hallucinations, illusion, lucid interval and obsessions with exemplification

- 5.2.1: Define delusion.
5.2.2: Describe types of delusions and their medicolegal importance.
5.2.3: Define hallucination.
5.2.4: Describe types of hallucinations and their medicolegal importance.
5.2.5: Define illusion with examples.
5.2.6: Define lucid interval.
5.2.7: Describe the medicolegal importance of lucid interval.
5.2.8: Define Impulse.
5.2.9: Describe impulsive disorders with examples.
5.2.10: Describe the obsessive-compulsive disorders with examples.

- **Lecture – 1 hr** [Assessment:](#) Written, Viva voce

FM5.3 - Describe Civil and criminal responsibilities of a mentally ill person

- 5.3.1: Describe Civil responsibility of a mentally ill person.
5.3.2: Describe Criminal responsibility of a mentally ill person.
5.3.3: Describe the M'Naughten Rule and critics about it.
5.3.4: Discuss the alternate hypotheses/tests in relation to criminal responsibility.
5.3.5: Describe the criminal responsibility in Automatism, Somnambulism, Somnolentia, Hypnotism and Intoxication.

FM5.4 - Differentiate between true insanity from feigned insanity

- 5.4.1: Differentiate between true and feigned insanity.

FM5.5 - Describe & discuss Delirium tremens

- 5.5.1: Define delirium tremens.
5.5.2: Describe the criminal responsibility in delirium tremens.

- **SDL – 1 hr** [Assessment:](#) Written, Viva voce

FM5.6 - Describe the Indian Mental Health Act, 1987 & Indian Mental Healthcare Act 2017 with special reference to admission, care and discharge of a mentally ill person

5.6.1: Describe the important definitions mentioned in Mental Health Care Act, 2017 (MHCA).

5.6.2: Describe the Rights of mentally ill person including 'Advance directive' as per the MHCA.

5.6.3: Describe the guidelines to start and run a 'Mental health establishment'.

5.6.4: Discuss on 'Admission, Treatment and Discharge of mentally ill person' as described in the MHCA.

5.6.5: Discuss on punishment for violation of provisions of MHCA.

Forensic Laboratory investigation in medical legal practice

- **SGD – 1 hr**

Assessment: OSPE, Viva voce

FM6.1 - Describe different types of specimen and tissues to be collected both in the living and dead: Body fluids (blood, urine, semen, faeces, saliva), Skin, Nails, tooth pulp, vaginal smear, viscera, skull, specimen for histo-pathological examination, blood grouping, HLA Typing and DNA Fingerprinting. Describe Locard's Exchange Principle

6.1.1: Describe the importance of trace evidences in crime investigation.

6.1.2: Explain Locard's principle of exchange in crime investigation.

6.1.3: Enlist the various trace evidences seen in different type of crimes (living and dead).

6.1.4: Discuss the importance of DNA profiling in forensic investigation.

6.1.5: Enlist body tissue and body fluid suitable for DNA profiling.

6.1.6: Discuss the importance of histopathology and cytology examination in forensic investigation.

6.1.7: Discuss importance of blood grouping in forensic investigation.

6.1.8: Discuss significance of HLA typing in forensic investigation.

FM6.2 - Describe the methods of sample collection, preservation, labeling, dispatch, and interpretation of reports

6.2.1: Describe method of collection, packing, labelling, sealing and dispatch of evidentiary materials to the laboratory.

6.2.2: Describe the method of interpretation of investigation reports like Chemical analysis, Histopathological examination, Microbiological examination etc.

FM6.3 - Demonstrate professionalism while sending biological or trace evidences to Forensic Science lab, specifying the required tests to be carried out, objectives of preservation of evidences sent for examination, personal discussions on interpretation of findings

6.3.1: Draft requisition letter to be sent along with the samples preserved for laboratory analysis/examination mentioning type of sample preserved, required tests to be done, and brief history of the case.

6.3.2: Demonstrate professionalism while sending the samples for analysis such as maintaining confidentiality and chain of custody.

FM14.21 - To collect, preserve, seal and dispatch exhibits for DNA-Finger printing using various formats of different laboratories.

14.21.1: Describe the procedure involved in collecting, preserving, sealing and dispatching exhibits for DNA profiling from a living individual.

14.21.2: Describe the procedure involved in collecting, preserving, sealing and dispatching exhibits for DNA profiling from a dead individual after conducting medicolegal autopsy.

14.21.3: Describe the procedure involved in collecting samples for DNA profiling depending on the laboratory policies of collecting blood on dry gauze or EDTA vacutainer or on FTA cards,

Emerging technologies in Forensic Medicine

• **SDL – 1 hr**

Assessment: Written, Viva voce

FM7.1 - Enumerate the indications and describe the principles and appropriate use for:- DNA profiling, Facial reconstruction, Polygraph (Lie Detector), Narcoanalysis, Brain Mapping, Digital autopsy, Virtual Autopsy, Imaging technologies

7.1.1: Discuss principle, procedure and medico-legal significance of DNA profiling.

7.1.2: Describe principle and medico-legal significance of Facial reconstruction.

7.1.3: Enlist different Lie detection tests.

7.1.4: Describe principle, procedure and medico-legal significance of Polygraph, Narcoanalysis and Brain mapping.

7.1.5: Describe principles of Virtual / Digital autopsy.

7.1.6: Describe the uses of different Imaging technologies in crime investigation.

Skills in Forensic Medicine & Toxicology

• **SGD – 2 hrs (Practicals)**

Assessment: OSPE, OSCE, Viva voce

FM14.4 - Conduct and prepare report of estimation of age of a person for medico-legal and other purposes & prepare medico-legal report in a simulated/ supervised environment

14.4.1: Explain the procedure of taking an informed consent from a person after explaining the importance and procedure of age estimation in criminal cases (accused/ victim of a crime) and civil cases (joining employment, obtaining pension, etc).

14.4.2: Estimate the age of a person by using physical, dental and radiological findings.

14.4.3: Prepare the medicolegal report on the age of a person.

- **SGD – 10 hr (along with discussion of concerned competencies (Mechanical injuries, firearm injuries, thermal injuries, asphyxia, sexual offences, etc) in other SGD)**

Assessment: OSPE, Viva voce, Practical record, Log Book

FM14.5 - Conduct & prepare post-mortem examination report of varied etiologies (at least 10) in a simulated/ supervised environment

14.5.1: Describe the techniques of conducting a medicolegal autopsy.

14.5.2: Describe the postmortem findings (external and internal) in a medicolegal autopsy.

14.5.3: Enumerate the ancillary investigations required (along with appropriate materials for such investigations) in a medicolegal autopsy.

14.5.4: Draft the postmortem report after a medicolegal autopsy.

Medicolegal autopsies may be a case of unnatural death, natural death, custodial death, alleged medical negligence, decomposed body, mutilated body.

- **SGD – 2 hrs (Practicals)**

Assessment: OSPE, Viva voce, Practical record,

Log Book

FM14.11 - To identify & describe weapons of medicolegal importance which are commonly used e.g. lathi, knife, kripa, axe, gada, gupta, farsha, dagger, bhalla, razor & stick. Able to prepare report of the weapons brought by police and to give opinion regarding injuries present on the person as described in injury report/ PM report so as to connect weapon with the injuries. (Prepare injury report/ PM report must be provided to connect the weapon with the injuries)

14.11.1: Document the information before commencing the weapon examination.

14.11.2: Examine and document the details of weapons of medicolegal importance.

14.11.3: Prepare a report on the weapon examined.

14.11.4: Opine whether the injuries present in the wound certificate/ postmortem report are possible to be caused by the weapon examined.

14.11.5: Explain the method of packing and handing over the weapon to concerned police (maintaining the chain of custody).

FM14.12 - Describe the contents and structure of bullet and cartridges used & to provide medico-legal interpretation from these

14.12.1: Describe the structure and contents of Rifled cartridge & prepare a medico-legal inference.

14.12.2: Describe the structure and contents of Shotgun cartridge & prepare a medico-legal inference.

- **SGD – 1 hr (Practical)**

record, Log Book

Assessment: OSPE, OSCE, Viva voce, Practical

FM14.16 - To examine & prepare medico-legal report of drunk person in a simulated/ supervised environment

14.16.1: Take an informed consent for examination of a person with alleged drunkenness.

14.16.2: Describe the procedure of examination and collection of evidentiary material for medicolegal purpose.

14.16.3: Prepare a medicolegal report and opinion in a drunkenness case.

14.16.4: Explain the procedure of handing over the evidentiary material to the investigating officer.

- **SGD – 1 hr (Practical)**

Log Book

Assessment: OSPE, Viva voce, Practical record,

FM14.19 - To identify & prepare medico-legal inference from bone fracture, soot particles, diatoms & wound healing (slides)

14.19.1: List the microscopic identifying features after examining the histopathological slides of brain infarct, liver cirrhosis, brain haemorrhage, bone fracture, pulmonary oedema, brain oedema, soot particles, diatoms & wound healing.

14.19.2: Describe the medico-legal inferences after examining the above mentioned histopathological slides.

Competencies in Internship

Certifiable Procedural skills desirable of Indian Medical Graduate in Forensic Medicine & Toxicology

A. An Intern must have observed or preferably assisted in:

- Documentation and certification of trauma (I)
- Diagnosis and certification of death (D)
- Legal documentation related to emergency cases (D)
- Certification of medico-legal cases e.g. Age estimation, Sexual Violence etc. (D)
- Establishing communication in medico-legal cases with police, public health authorities, other concerned departments, etc (D)

I- Independently performed on patients,

O- Observed in patients or on simulations,

D- Demonstration on patients or simulations and performance under supervision in patients

B. An Intern must have observed a medicolegal autopsy / postmortem

Compulsory rotating Internship posting of 7 days in Forensic Medicine and Toxicology

Log book to be maintained.

The internship posting has to be extended (repeated) till all the certifiable skills are achieved.

Use of skill lab is desirable wherever available

Sl no	Competency	Number of times to be done	Assessment	Setting
1	IMG should independently examine a trauma patient / simulated patient and document and certify trauma	02	Skill assessment	Casualty / EMD
2	IMG should demonstrate on patients or simulations and performance under supervision in patients the diagnosis and certification of death	02	Skill assessment / DOAP Session	Casualty / EMD / Ward / ICU

3	IMG should demonstrate the legal documentation related to emergency care in a medicolegal register / accident register maintained at casualty / EMD	02	Skill assessment / DOAP Session	Casualty / EMD
4	IMG should examine, document and certify in a medicolegal case of age estimation	01	Skill assessment / DOAP Session	Forensic Medicine /Casualty / EMD
5	IMG should examine, document and certify in a medicolegal case of victim of Sexual violence	01	Skill assessment / DOAP Session	OBG /Forensic Medicine /Casualty / EMD
6	IMG should examine, document and certify in a medicolegal case of accused of Sexual violence	01	Skill assessment / DOAP Session	Forensic Medicine /Casualty / EMD
7	IMG should demonstrate communication in medicolegal cases with police	01	Skill assessment / DOAP Session	Forensic Medicine /Casualty / EMD
8	IMG should demonstrate communication in medicolegal cases with public health authorities	01	Skill assessment / DOAP Session	Forensic Medicine /Casualty / EMD
9	IMG should demonstrate communication in medicolegal cases with Radiology / Pathology / Microbiology / FSL departments	01	Skill assessment / DOAP Session	Forensic Medicine /Casualty / EMD
10	IMG should observe and document a medicolegal autopsy / postmortem examination	01	Skill assessment / DOAP Session	Forensic Medicine

ASSESSMENT IN FORENSIC MEDICINE & TOXICOLOGY

SCHEME OF EXAMINATION

Formative assessment

TABLE SHOWING SCHEME FOR CALCULATION OF INTERNAL EXAMINATION MARKS

Theory (Maximum marks)		Practical (Maximum marks)	
Theory papers	30*	Practical exercises (Bone/x-ray examination, certificate writing, autopsy questions, age estimation by dentition, spotters)	30**
Professionalism and part completion tests	10	Level of participation in AETCOM activities	5
		Practical record book	5
TOTAL	40	TOTAL	40
Please note: * marks for each of the three internal examination theory assessments must be calculated out of 30 marks, regardless of the maximum marks. ** marks for each of the three internal examination practical assessments must be calculated out of 30 marks, regardless of the maximum marks. Only the final marks out of 40 (as in the table) needs to be submitted to the University, separately for theory and practical for each internal assessment.			

1. **Summative Assessment** - An assessment conducted at the end of instruction to check how much the student has learnt.
2. **Formative Assessment** - An assessment conducted during the instruction with primary purpose of providing feedback for improving learning.

3. **Internal Assessment** - Range of assessments conducted by the teachers teaching a particular subject with the purpose of knowing what is learnt and how it is learnt. Internal assessment can have both formative and summative functions.

Scheduling of Internal Assessment - In Phase II MBBS there will be ONE Internal assessment in theory and practicals. - In Phase III part 1 MBBS there will be TWO Internal assessments in theory and practicals. One of the test should be prelim or similar to university examination. An average of the marks scored in the three internal assessment examinations will be considered as the final internal assessment marks.

Theory IA can include: Theory tests, seminars, quizzes, interest in subject, scientific attitude etc. Written tests should have essay questions, short notes and creative writing experiences.

Practical IA can include: practical tests, Objective Structured Practical Examination (OSPE), Directly Observed Procedural Skills (DOPS), records maintenance and attitudinal assessment.

4. **Assessment of Log-book**- Log book should record all activities like seminar, symposia, quizzes and other academic activities. It should be assessed regularly and submitted to the department. Up to twenty per cent IA Theory marks should be for Log book assessment.

5. **Assessment of Practical Record book-** Practical book should record all skills and other practical exercises done during the academic programme. It should be assessed regularly and submitted to the department. Up to twenty per cent IA Practical marks should be for Log book assessment.
6. **Internal Assessment for AETCOM will include:** - Written tests comprising of short notes and creative writing experiences. OSCE based clinical scenarios and/or viva voce. Skill competencies acquired during the Professional Development Programme (AETCOM) must be tested during the practical and viva voce.
7. **Feedback in Internal Assessment** - Feedback should be provided to students throughout the course so that they are aware of their performance and remedial action can be initiated well in time. The feedbacks need to be structured and the faculty and students must be sensitized to giving and receiving feedback. It is also recommended that students should sign with date whenever they are shown IA records in token of having seen and discussed the marks.
8. **Criteria for appearing in University examination:** Learners must secure at least 50% marks of the total marks (combined in theory and practical; not less than 40 % marks in theory and practical separately) assigned for internal assessment in order to be eligible for appearing at the final University examination.
9. Internal assessment should be based on competencies and skills.
10. At least 50% marks of the total marks combined in theory and practicals /clinical assigned for internal assessment is to be obtained in a particular subject to be eligible to appear for university examinations. A candidate who has not secured requisite aggregate in the internal assessment may be permitted to appear for another internal examination as a remedial measure. If he/she successfully completes the remediation measures prescribed by the Institution / University as the case may be, only then he/she is eligible to appear for University Examination.
11. Students must secure at least 50% marks of the total marks (combined in theory and practical) assigned for internal assessment to be declared successful at the final university examination of that subject.
12. The third internal examination is the examination to be conducted on the lines of the university examination.
13. Internal assessment marks will reflect as a separate head of passing at the university examination.
14. The internal examination marks for the 1st, 2nd & 3rd internal examinations shall be submitted to the University on or before dates mentioned in University calendar.
15. Professionalism (punctuality, respect for teachers, communication with peers, timely completion and submission of record books and participation / presents in SGD) must be assessed and form a component of the marks given for internal assessment as shown in Annexure 1.
16. A clear record of all components that add to the internal assessment marks needs to be maintained by the institution and retained by them for at least 2 years after completion of the examination. Institutions may be asked to provide these details by the University as and when required.
17. A candidate who has not secured requisite aggregate in the internal assessment may be subjected to remedial assessment by the institution. If he/ she successfully complete the same, he/she is eligible to appear for University Examination. Remedial assessment shall be completed before submitting the internal assessment marks online to the University.

Blue Print & Assessment methods - Theory

Number of QPs for the subject: One

Theory marks 100

Theory Question Paper: Blue print

This shows the weightage given to each chapter in the summative assessment. This improves the content validity by distributing the assessment of learners in the competencies that are represented by learning objectives under each chapter.

Number of QPs for the subject: One.

Only CORE competencies shall be considered for framing questions. Each paper should contain the following distribution of questions (as shown in below table).

Theory Question Paper:

Only CORE competencies shall be considered for framing questions. Each paper should contain the following distribution of questions (as shown in below table).

Type of questions	Marks per question	Number of questions	Total marks
MCQs	1	10	10
Long Essay questions	10	2	20
Short essay questions	5	8	40
Short answer questions	3	10	30

Distribution of marks in suggested blue print:

Section	Chapters	Marks allotted	Number of questions			
			MCQs	Long essay	Short essay	Short answer
Section 1	General information	5 marks	2			1

	[Dying declaration, Dying deposition, Medical records, Cause of death]					
Section 2	Forensic Pathology [Thanatology, Medicolegal autopsy, Mechanical asphyxia, Thermal deaths, Death due to starvation and neglect, Infanticide]	25 marks*	2	1	2	1
Section 3	Clinical Forensic Medicine [Identification, Mechanical injuries, Firearm injuries, Regional injuries, Sexual offences, Virginity, Pregnancy, Abortion, Impotence, Sterility, Sterilization, Artificial Insemination, Torture, Child abuse]	25 marks*	2	1	2	1
Section 4	Medical Jurisprudence [Medical law and ethics, Euthanasia, Bioethics, Research ethics]	15 marks	1		1	3
Section 5	Forensic Psychiatry, Forensic Laboratory Investigation in medico-legal practice	5 marks	2			1
Section 6	General Toxicology, Chemical Toxicology, Pharmaceutical Toxicology, Biototoxicology, Sociomedical Toxicology, Environmental Toxicology	25 marks*	1		3	3
	Total number of questions	100 marks	10	2	8	10

Section	Chapters	Marks allotted	Number of questions			
			MCQs	Long essay	Short essay	Short answer
Section 1	General information [Competencies 1.7 to 1.10]	5 marks	2			1
Section 2	Forensic Pathology [Competencies 2.1 to 2.28]	25 marks*	2	1	2	1
Section 3	Clinical Forensic Medicine	25 marks*	2	1	2	1

	[Competencies 3.1 to 3.23, 3.26 to 3.30]					
Section 4	Medical Jurisprudence [Competencies 4.1 to 4.8, 4.10 to 4.24, 4.26]	15 marks	1		1	3
Section 5	Forensic Psychiatry, Forensic Laboratory Investigation in medico-legal practice [Competencies 5.1 to 5.5, 6.1 to 6.2]	5 marks	2			1
Section 6	Toxicology [Competencies 8.1 to 8.10, 9.1 to 9.6, 10.1, 11.1, 12.1, 13.1 to 13.2]	25 marks*	1		3	3
	Total number of questions	100 marks	10	2	8	10

*The Long essay questions shall be chosen from any two sections of Sections 2, 3 and 6. The distribution of questions for these sections shall be as follows:

- Two sections should contain 2 MCQs, 1 Long essay question, 2 Short essay questions and 1 Short answer question.
- One section should contain 1 MCQ, 3 Short essay questions and 3 Short answer questions.

One Long Essay question and One Short Essay question should be of Problem solving or on Clinical application.

35% questions should be of the Higher order thinking

This shows the weightage given to each topic in the summative assessment. This improves the content validity by distributing the assessment of learners in the competencies that are represented by learning objectives under each topic.

Blue Print & Assessment methods - Practicals

Practicals 80

Viva Voce 20

Practical Question Paper: Blue print

OSPE in FMT:

Station	Exercise	Marks	Duration
Station-1	Wound certificate	10	30 min
	Weapon examination	5	
Station-2	Age certificate	15	30 min
Station-3	Skeletal remains	10	20 min
Station-4 (Any one exercise)	Victim of rape	10	20 min
	Accused of rape		
	Drunkenness certificate		
Station-5	PM certificate	10	20 min
Station-6	Spotters	10	10 min
Station-7	Blood grouping	5	10 min
Station-8 (Any one exercise)	Preservation of evidentiary materials in poisoning	5	10 min
	Preservation of DNA material for analysis		
	Gestational age of foetus		
	MCCD		

Detailed planning of practical assessment:

Station	Exercise	Assessment	Marks	Duration
Station-1	Wound certificate	Option-A: - A case scenario containing the details of a patient, history and part-task trainer with injuries will be given. - Student will be asked to draft a certificate as per the format based on above case details. - Evaluation will be based on the checklist. Option-B: - A case scenario containing the details of a patient, history, multiple photographs of injuries with scale attached (printed in a single page) will be given. - Student will be asked to draft a certificate as per the format based on above case details. - Evaluation will be based on the checklist.	10	30 min
	Weapon	A weapon related to above wound certificate will	5	

	examination	be given. • Student will be asked to examine and draft a report as per the format. • Evaluation will be based on the checklist.		
Station-2	Age certificate	• A case scenario containing the details of a patient, history, findings of General Physical Examination, Tooth eruption (picture of dentition) and X-ray film/s will be given. • Student will be asked to draft a certificate as per the format based on above case details. • Evaluation will be based on the checklist.	15	30 min
Station-3	Skeletal remains	• A case scenario containing the history and relevant findings of scene from where the bone/s were recovered will be given. • Student will be asked to examine the bone/s and draft a report as per the format. • Evaluation will be based on the checklist.	10	20 min
Station-4 (Any one exercise)	Victim of rape	• A case scenario containing the details of a patient, history and findings related to sexual violence (victim of rape) will be given. • Student will be asked to draft a report in a printed modified format (as shown in annexure) based on case details and answer questions related to case scenario. • Evaluation will be based on the checklist.	10	20 min
	Accused of rape	• A case scenario containing the details of a patient, history and findings related to sexual violence (accused of rape) will be given. • Student will be asked to draft a report in a printed modified format (as shown in annexure) based on case details and answer questions related to case scenario. • Evaluation will be based on the checklist.		
	Drunkenness certificate	• A case scenario containing the details of a patient, history and findings related to drunkenness will be given. • Student will be asked to draft a report as per the format based on case details and answer questions		

		related to case scenario. • Evaluation will be based on the checklist.		
Station-5	PM certificate	• A case scenario containing the details of a patient, history and postmortem findings will be given. • Student will be asked to draft the PM certificate and give opinion on cause of death, time since death and any other questions related to case scenario. • Evaluation will be based on the checklist.	10	20 min
Station-6 (Spotters)	Hair, Semen, & other Biological fluids; Blood - Identification of species; Photographs / Specimens; Poisons; Histopathology Slides; Firearm cartridge	• It should contain 10 spotters. • Each spotter will be awarded maximum of one mark for correct responses. • Each spotter should be completed by 2 minutes duration. • Ideally spotters should contain applied type of questions related to content of the spotter. • Evaluation will be based on the marks allotted to structured questions.	10	10 min
Station-7	Blood grouping	• A case scenario containing the details of a patient, history and relevant findings related to blood grouping will be given. • Student will be asked to determine the blood group of a given sample. • Evaluation will be based on the checklist.	5	10 min
Station-8 (Any one exercise)	Preservation of evidentiary materials in poisoning	• A case scenario containing the details of a patient, history and clinical features of any poisoning will be given. • Student will be asked to list the various evidentiary materials to be preserved in such cases, write the labels for such preservation, and write the letters to FSL for analysis. • Evaluation will be based on the checklist.	5	10 min
	DNA material	• A case scenario containing the details of a patient, history and relevant findings related to DNA analysis will be given.		

		• Student will be asked to list the various evidentiary materials to be preserved in such cases, write the labels for such preservation, and write the letters to FSL for analysis. • Evaluation will be based on the checklist.		
	Gestational age of foetus	• A case scenario containing the details of a patient, history and findings related to gestational age will be given. • Student will be asked to determine the gestational age and answer the questions related to case scenario. • Evaluation will be based on the checklist.		
	MCCD	• A case scenario containing the details of a patient, history and clinical findings related to MCCD will be given. • Student will be asked to draft a certificate as per the format based on above case details. • Evaluation will be based on the checklist.		

ANNEXURE – 1

Suggested format for assessing professionalism

Semester	Overall Attendance (5)	Timely submission of record books (5)	Takes the Trouble to Complete the Record book well (5)	Behaves respectfully with peers and teachers (5)	Participation in SGD (5)	Total (25)	Date	Signature of student	Signature of Teacher
1									
2									
3									
4									

Guidelines for scoring (to be shown to the student and discussed with them)

Attendance – 95-100% - 5; 90-94% - 4; 85-89% - 3; 80-84% - 2; 79-75% - 1

Timely submission of records – Always submits the record on time – 5; Often submits the record on time – 4; Sometimes submits the record on time – 3; Rarely submits the record on time – 2; Never submits the record on time – 1

Puts the efforts to complete the record well – Diagrams are neatly drawn with complete labelling &/or excellent writing of exercises – 5; Diagrams are of above average quality with nearly complete labelling &/or good writing of exercises – 4; Diagrams are of average quality with partial labelling &/or complete writing of exercises - 3; Diagrams are of below average quality with inadequate labelling &/or incomplete writing of exercises – 2; Diagrams are of unacceptable standard with grossly inadequate labelling &/or poor writing of exercises – 1

Behaves respectfully with peers and teachers – Always speaks politely and demonstrates the appropriate body language with peers and teachers – 5; Often speaks politely and demonstrates the appropriate body language with peers and teachers – 4; Sometimes speaks politely and demonstrates the appropriate body language with peers and teachers – 3; Rarely speaks politely and demonstrates the appropriate body language with peers and teachers – 2; Never speaks politely & demonstrates the appropriate body language with peers & teachers -1

Participation in SGD (Small Group Discussion)- Always participates / presents in SGD -5; Often participates / presents in SGD -4; Sometimes participates / presents in SGD -3; Rarely participates / presents in SGD -2; Never participates / presents in SGD -1

Annexure - 2

Teaching Learning Methods

□ Didactic lectures should be made more interactive by encouraging the more involvement of the students. In the present digital era, student's involvement is more with usage of technology. For examples, many polling sessions, quizzes etc can be done using google slides and other apps like Kahoot, Socrative, menti.com etc.

□ Small group discussion (SGD) should be planned properly and discussed among the faculty members before taking the class. As far as possible, uniformity should be maintained in the SGD by various facilitators. Case based learning (CBL) and problem-based learning (PBL) may be used to make the learner understand and learn about the various aspects in order to achieve the particular competency.

□ Encourage the students learn themselves through self-directed learning (SDL). SDL sessions may be planned with objectives in order to cover the particular competency. These sessions may be conducted by providing learning material (research articles, public news, videos, etc) by a teacher and ask the students to search on a particular topic. Students should learn themselves by going through available resources and come back to classes allotted for SDL sessions where teacher able to connect the learning of students in order to achieve the competency.

□ Integrated classes should be planned in order to cover the competency involving the topics from different subjects. These classes can be taken using Nesting, Temporal Coordination or Sharing. Case linkers may be used to link the topic/subject area among different subjects/ departments.

□ Skills should be taught using the clinical cases at hospital wards/casualty/EMD, simulation in skills labs and/or departmental demonstration rooms. Case scenarios may be developed while teaching at skills lab and/or demonstration rooms.

Example for teaching the clinical examination in poisoning/envenomation:

□ **Case scenario:** A boy playing in the school ground was brought with history of pain and swelling on the left foot, swelling was progressive in nature. On examination, blood pressure was decreased and heart rate was increased. Local examination revealed edema and ecchymosis around the left foot with two puncture wounds over the lateral aspect.

□ **Demonstration of clinical examination:** Mannequins or standardised patients in the skills lab may be used for examination and recording of vital parameters like pulse, BP, RR, SPO2 and state of pupils.

Also, response to treatment can be.

□ **Diagnosis and management:** Discuss the differential diagnosis, investigations and definitive diagnosis. Discuss the various treatment modalities. The response to drugs used for treatment can be demonstrated using high fidelity mannequins.

☐ **Medicolegal responsibilities:** The medicolegal responsibilities such as medicolegal documentation, and police intimation should be demonstrated in a simulated environment and using standard formats.

Example for teaching the topic Injuries/ Trauma with integration:

Linker Case: A 40-year-old male construction worker was brought to the casualty with history of fall from the 4th floor while working at a construction site. As a result of this, he sustained multiple injuries (can be displayed in the form of photographs). He was brought by his co-worker to the hospital. On reaching the hospital, patient was unconscious and unresponsive.

Subjects for integration: Forensic Medicine, General Surgery.

☐ Forensic Medicine: Topics covered in this subject include different types of mechanical injuries possible in such accidents and other relevant topics related to mechanical injuries. [Competencies to be covered: FM 3.3, 3.4, 3.8]

☐ General Surgery: First aid treatment, Basic life support, Transportation of patient, Basic management of injuries at hospital. [Competencies to be covered: SU 17.1, 17.2, 17.3]

Type of Integration:

☐ Horizontal: Temporal coordination can be done if is done in the same
☐ phase. Vertical: Nesting can be used if it is done in two different phases.

Additional details to case scenario:

☐ In addition to linker case, case details need to be added by respective departments depending on the progression of the class (such as clinical features, internal injuries, postmortem findings etc).

☐ Case details may be introduced step by step in order to involve students in discussion.

Example for teaching the topic Drugs / Substances of abuse with integration:

Linker Case: A 17-year-old student was brought by his parents to the hospital with a history of suspected substance abuse and behavioural changes since 6 months. On examination, the patient was anxious, restless and was hesitant to talk.

Subjects for integration: Pharmacology, Forensic Medicine, Psychiatry.

☐ Pharmacology: Topics covered in this subject include Definitions, List of drugs of abuse, Mechanism of drug addiction. [Competencies to be covered: PH 1.22, 1.23]

- ☐ Forensic Medicine: Description of features and management of drugs/substances of abuse. [Competencies to be covered: FM 12.1]
- ☐ Psychiatry: Etiology, clinical features, treatment of drugs/substances of abuse. [Competencies to be covered: PS 4.1, 4.2, 4.3, 4.4, 4.6, 4.7]

Type of Integration:

- ☐ Horizontal: Temporal coordination/ Sharing can be done if is done in the same
- ☐ phase. Vertical: Nesting can be used if it is done in two different phases.

Additional details to case scenario:

- ☐ In addition to linker case, case details need to be added by respective departments depending on the progression of the class (such as clinical features, behavioural changes, complications, legal problems etc).
- ☐ Case details may be introduced step by step in order to involve students in discussion.

Annexure - 3

Integration topics

Integration: The teaching should be aligned and integrated horizontally and vertically recognizing the importance of medico-legal, ethical and toxicological issues as they relate to the practice of medicine.

Integration of Forensic Medicine with Other departments:

The suggested topics, competencies and the subjects/departments for integrated teaching are shown in below table.

Sl. No.	Topic for integration	Subject [Competencies]
1	Wound healing	General Surgery [SU 5.1, 5.2, 5.3, 5.4] Pathology [PA 5.1] Forensic Medicine [FM 3.6]
2	General toxicology	Forensic Medicine [FM 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8] Pharmacology [PH 1.4, 1.5, 1.11] General Medicine [IM 21.1, 21.5, 21.6, 21.7, 21.8]
3	Insecticides	Forensic Medicine [FM 8.6] Pharmacology [PH 1.52] Community Medicine [CM 3.8]
4	Corrosives	Forensic Medicine [FM 9.1] General Medicine [IM 21.3]
5	Heavy metal poisoning	Forensic Medicine [FM 9.2, 9.3] Pharmacology [PH 1.53]
6	Plant poisons	General Medicine [IM 21.2] Forensic Medicine [FM 10.1]
7	Snake, scorpion, insect bites	Forensic Medicine [FM 11.1] General Medicine [IM 20.1, 20.2, 20.3, 20.4, 20.5, 20.6, 20.7, 20.8, 20.9]

8	Alcohol disorders	Pharmacology [PH 1.20, 1.21] Pathology [PA 12.1, 25.4] General Medicine [IM 5.5] Forensic Medicine [FM 9.4]
9	Drugs of abuse	Pharmacology [PH 1.22, 1.23] Forensic Medicine [FM 12.1] Psychiatry [PS 4.1, 4.2, 4.3, 4.4, 4.6, 4.7]

Annexure -4

Topics for Electives

- Disaster management
- Medicolegal aspects of healthcare / hospital administration
- Deposing evidence in a Court of Law
- Medicolegal aspects in management of emergency cases
- Forensic odontology
- Disaster victim identification
- Forensic anthropology
- Forensic psychiatry
- Forensic radiology
- Forensic toxicology

- Snake bite – species identification and management
- Crime scene examination
- Forensic ballistics

Annexure - 5

Reference Books and Journals

Suggested references (as per Vancouver style): (Specification mentioned such as edition – subject to change with newer edition)

Basic references

- 1) Reddy KSN, Murthy OP. The Essentials of Forensic Medicine and Toxicology. 34th edition, 2017. Jaypee Brothers Medical Publishers, New Delhi.
- 2) Aggrawal Anil. Forensic Medicine and Toxicology for MBBS. 2012. Avichal Publishing Company, Sirmour (HP).
- 3) Biswas G. Review of Forensic Medicine & Toxicology, 3rd edition, 2015, Jaypee Brothers Medical Publishers, New Delhi. 2) Pillay VV. Textbook of Forensic Medicine and Toxicology, 19th edition, 2019, Paras Medical Publishers, Hyderabad.
- 4) Pillay VV. Textbook of Forensic Medicine and Toxicology, 19th edition, 2019, Paras Medical Publishers, Hyderabad.

- 5) Bardale R. Principles of Forensic Medicine & Toxicology, 2nd edition, 2016, Jaypee Brothers Medical Publishers, New Delhi.
- 6) Nandy A. Principles of Forensic Medicine including Toxicology, 3rd edition, 2010, New Central Book Agency.
- 7) Subrahmanyam BV. Parikh's Textbook of Medical Jurisprudence, Forensic Medicine and Toxicology, 8th edition, 2019, CBS Publishers.
- 8) Guharaj PV, Gupta SK. Forensic Medicine and Toxicology, 3rd edition, 2019, Universities Press (India) Private Ltd., Hyderabad.
- 9) Kannan K. Modi's Medical Jurisprudence and Toxicology, 26th edition, 2019, LexisNexis.
- 10) Vij K. Textbook of Forensic Medicine and Toxicology: Principles and Practice, 6th edition, 2014, Elsevier Ltd.
- 11) Ignatius PC. Forensic Medicine and Toxicology, 4th edition, 2019, Elsevier India.
- 12) Pillay VV. NACPFMT's Practical Medicolegal Manual: Medical Ethics, Clinical Forensics & Toxicology, 1st edition, 2019, Paras Medical Publishers, Hyderabad.
- 13) Bakkannavar SM. Forensic Medicine and Toxicology: Practical manual, 1st edition, 2018, Elsevier India.
- 14) Borah. Medical Ethics for Students and Doctors, 1st edition, 2014, Ahuja Publishers.

Advanced references (may also include journals/ web/ other electronic sources).

- 1) Saukko P, Knight B. Knight's Forensic Pathology. 4th edition. 2015, CRC Press, London.
- 2) Jason Payne James, Anthony Busuttil, William Smock. Forensic Medicine; Clinical and Pathological Aspects. 2003, Greenwich Medical Media Ltd, London.
- 3) DiMaio VJ, DiMaio D. Forensic Pathology. 2nd edition. 2001, CRC Press, London.
- 4) Dogra TD, Rudra A. Lyon's Medical Jurisprudence and Toxicology. 11th edition (reprint), 2018. Delhi Law House, Delhi.
- 5) Pillay VV. Modern Medical Toxicology, 4th edition, 2013, Jaypee Brothers Medical Publishers Ltd., New Delhi.
- 6) Journal of Karnataka Medico-Legal Society.
- 7) Journal of South India Medico-Legal Association.
- 8) Journal of Indian Academy of Forensic Medicine.
- 9) Journal of Indian Society of Toxicology
- 10) Journal of Forensic and Legal Medicine
- 11) Journal of Forensic Sciences
- 12) Indian Journal of Medical Ethics



Curriculum for Community Medicine 2022



**Ramaiah Medical College
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Department of Community Medicine Curriculum

1. Introduction to Department

Community Medicine subject plays a crucial role in training an Indian Medical graduate. Given the roles and attributes of IMG by National Medical Commission of India this specialty offers the students to learn promotive, preventive, curative and rehabilitative aspects of health care with opportunity for vertical and horizontal integration.

This subject is taught to the students throughout the three professional years of MBBS. The subject gives them a strong foundation, opportunity to the students to train them as physicians of first contact. It equips the IMG in Community oriented comprehensive health care. The IMG are provided with opportunity to harness communication skills, working as team, leadership qualities, networking, research and advocacy apart from learning delivery of health care at primary and secondary level.

The Department of Community Medicine is well equipped with all the infrastructure required for implementing the competency based medical education curriculum. The competent, experienced and dedicated faculty provide a conducive environment for the students to learn beyond the classroom through Community Based Training Program (CBTP). The faculty members adapt innovative teaching and learning methods such as experiential learning, simulation games, case based learning and objective structured clinical examination.

Family Adoption Program (FAP) introduced by the National Medical Council (NMC) is being implemented in the college through the department. This program is mutually beneficial for both students and the adopted families. While the students learn the dynamics within the family, the families are benefitted through improved knowledge and access to health care.

The Rural Health Training Centers (RHTC) and Urban Health Training Centers (UHTC) that are run by the department form a strong community base that is utilized for teaching and learning. The department organizes many extension and outreach activities that provide services to the community which also adds to the learning opportunity available to the students.

This document is adapted from Curriculum Based Medical Education (CBME) framed by NMC.

2. Goal

The goal of teaching Community Medicine for undergraduates is to prepare them to be the physician of first contact for the community they would serve.

3. Course outcomes

Knowledge

1. Apply the basic concepts in health and disease for promotion of health and prevention of disease, at individual, family and community level considering the given social, cultural, economic and demographic context.
2. Apply the appropriate epidemiological and statistical techniques for data collection, compilation, analysis, interpretation and report writing for health research.
3. Describe the principles of epidemiology for the prevention and control of communicable and non-communicable diseases in local and global context
4. Describe appropriate interventions for prevention and control of environmental and occupational health issues.
5. Comprehend the health care delivery system in India and the implementation of National health programs

Skills

6. Ability to advice and counsel the individuals, family and community on promotion of reproductive and child health care including nutrition.
7. Ability to conduct health awareness program at community level; and provide health education at individual and family level

Attitude, ethics and Communication

8. Communicate to the individual, families and communities regarding health promotion and disease prevention

4. Objectives

4.1 Knowledge

At the end of the course, the student should be able to: -

- i. Describe the concepts of health, disease and public health.
- ii. Describe comprehensive health care including rehabilitation.
- iii. Describe the health care delivery system in India.
- iv. Describe the various National Health Programmes and its implementation.
- v. Outline the demographic pattern of the country and appreciate the roles of the individual, family, community and socio-cultural milieu in health and disease.

- vi. Describe various epidemiological methods.
- vii. Describe the various steps of research cycle, including research question, hypotheses, objectives, methodology & results towards addressing health problems.
- viii. Describe and interpret the statistical techniques & methods in health research.
- ix. Demonstrate knowledge of principles towards organizing prevention and control of communicable and non-communicable diseases in the community or a hospital setting.
- x. Discuss the determinants of health among special groups – reproductive age group, children, adolescents, older persons, disabled, tribal, marginalized and other vulnerable population.
- xi. Describe the health information systems.
- xii. Enunciate the principles and components of primary health care and the national policies to achieve the sustainable development goals through one health approach.
- xiii. Describe the importance of water, sanitation and nutrition in human health.
- xiv. Identify the environmental and occupational hazards and elucidate their control measures.
- xv. Explain the principles of health education, health economics, health planning & health administration.
- xvi. Discuss the role of voluntary & international agencies in health.

4.2 Skills

At the end of the course, the student should be able to: -

- i. Use epidemiology as a scientific tool to make rational decisions relevant to community and individual.
- ii. Apply the basic epidemiological methods to assess the health problems in the community and suggest suitable preventive and control measures for the same.
- iii. Collect, analyse, interpret, and present simple community and hospital-based data and apply appropriate bio-statistical methods and techniques to analyses the same.
- iv. Diagnose and manage common health problems and emergencies at the individual, family and community levels keeping in mind the existing health care resources and in the context of the prevailing socio-cultural beliefs.
- v. Diagnose and manage maternal and child health problems; advise the couple and the community on the various family planning methods available in the context of the national priorities.
- vi. Diagnose and manage common nutritional problems at the individual and community level.
- vii. Plan, implement and evaluate a health education programme with the skill to use simple audio-visual aids.
- viii. Interact with other members of the health care team and participate in the organization of health care services and implementations of national health programmes.
- ix. Organize health care services for special groups like mothers, infants, under-five children, school children, adolescents, geriatric, differently abled in urban slum, rural and tribal areas
- x. Organize health care during disasters and other calamities.
- xi. Coordinate and liaison with various agencies (Governmental, Non-Governmental and Voluntary organizations).
- xii. Apply the appropriate epidemiological and statistical techniques for data collection, compilation, analysis, interpretation and report writing for health research.

4.3 Ethics, Attitude and Communication

- i. Demonstrate ability to communicate and counsel patients and their families with patience, respectful, nonthreatening, non-judgmental and empathetic manner.
- ii. Apply fundamental principles of bioethics such as beneficence, non-maleficence and justice in patient care and community development.
- iii. Promote autonomy and shared responsibility as a guiding principle in health seeking and patient care especially in reproductive health, family planning and management of diseases.
- iv. Demonstrate justice as a guiding principle in encounters with patients and their families especially in mental illnesses, socially isolated communities and diseases such as HIV, leprosy and others.
- v. Demonstrate respect while interacting with patients, fellow team members, superiors and other health care workers.
- vi. Demonstrate empathy for patients.
- vii. Demonstrate an understanding of the implications and the appropriate procedure and response to be followed in the event of medical errors such as Adverse Events Following Immunization (AEFI), improper Bio-Medical Waste (BMW) management.
- viii. Demonstrate ability to work as an effective leader as well as a member of health team.
- ix. Appropriately address queries of patients and their families attending a health facility regarding disease control measures and national health schemes.
- x. Administer informed consent and ensure confidentiality in patient care and health related research.
- xi. Demonstrates ability to maintain required documentation in health care (including correct use of medical records).

4.4 Integration

- i. Develop capabilities of synthesis between cause of illness in the environment or community and individual health.
- ii. Respond with leadership qualities to institute remedial measures for the same.

5. Suggested Teaching Learning methods

- **Cognitive**
 - Interactive lectures
 - Small Group Discussion
 - Self-Directed Learning
- **Psychomotor**
 - Practical Demonstration
 - Field Visit to institutions of Public health importance
 - Clinico-social Case Discussion
 - Family Study
- **Affective domain**
 - Role Play
 - Simulation games
 - Case studies
 - Reflective writing
 - Mentoring
 - Immersion into communities

Table 1: Minimum Teaching Hours and Teaching Learning Methods

SI No.	Professional Year	No. of competencies	No. of hours					
			Lecture	SGD/ DOAP/ Field Visit	SDL	Clinico- social Discussion	AETCOM	FAP
1.	First	30	20	27	5	-	-	27
2.	Second	34	20	30	10	60	8	30
3.	Third: Part I	43	40	60	5	108	6	15
4.	Third: Part II							6
	Total	107	80	117	20	168	14	78

Table 2: Family Adoption Programme – Year-wise allotment of hours

SI No.	Professional Year	No. of visits	No of Hours
1.	First	9	27
2.	Second	6	30
3.	Third	5	15
4.	Fourth year	1	6
	Total	21	78

Table 3: Family Adoption Programme - Methodology

Professional Year	Competency the student should be able to	Objectives	Suggested Teaching Learning methods	Suggested Assessment methods	Teaching Hours
1 st Professional (27 Hours)	- collect demographic profile of allotted families. - take history and	By the end of this visit, students should be able to compile the basic demographic profile of allocated family members.	Family survey, Community clinics.	Community case presentation, OSPE, Log book, journal of visit.	6 hrs

Professional Year	Competency the student should be able to	Objectives	Suggested Teaching Learning methods	Suggested Assessment methods	Teaching Hours
	conduct clinical examination of all family members.				
	organize health check-up and coordinate treatment of adopted family under overall guidance of mentor	By the end of this visit, students should be able to report the basic health profile and treatment history of allocated family members	Community clinics, Multispecialty camps	Community case presentation, OSPE, logbook, journal of visit	9 hrs
	Maintain communication & follow up of remedial measures	By the end of this visit, students should be able to provide details of communication maintained with family members for follow-up of treatment and suggested remedial measures.	Reporting of follow up visits, PRA techniques (transact walk, group discussion) Community clinics.	Community case presentation, OSPE, logbook, journal of visit.	6 hrs
	Take part in environment protection and sustenance activities.	By the end of this visit, students should be able to report the activities undertaken for environment protection and sustenance like study of housing environment of allotted families, tree plantation/ herbal plantation	Participation in and Process documentation of activities (NSS activities) along with reporting of photographic evidences.	Logbook based certification of competency, journal of visit.	6 hrs

Professional Year	Competency the student should be able to	Objectives	Suggested Teaching Learning methods	Suggested Assessment methods	Teaching Hours
		activities conducted in the village.			
2 nd Professional (30 Hours)	Take history and conduct clinical examination of all family members.	By the end of this visit, students should be able to compile the updated medical history of family members and report their vitals and anthropometry.	Family survey, Community clinics.	Community case presentation, OSPE, logbook, journal of visit.	6 hrs
	Organize health check-up and coordinate treatment of adopted family under overall guidance of mentor.	By the end of this visit, students should be able to report the details of clinical examination like Hb %, blood group, urine routine and blood sugar along with treatment history of allocated family members.	Community clinics, Multispecialty camps.	Community case presentation, OSPE, logbook, journal of visit.	9 hrs
	Maintain communication & follow up of remedial measures.	By the end of this visit, students should be able to provide details of communication maintained with family members for follow-up of treatment, and suggested remedial measures along with details of vaccination drive.	Reporting of follow up visits, PRA techniques (transact walk, group discussion) Community clinics.	Community case presentation, OSPE, logbook based certification of competency, journal of visit.	9 hrs

Professional Year	Competency the student should be able to	Objectives	Suggested Teaching Learning methods	Suggested Assessment methods	Teaching Hours
	Take part in environment protection and sustenance activities.	By the end of this visit, students should be able to report the activities undertaken for environment protection and sustenance like study of environment of families, tree plantation/ herbal.	Participation in and Process documentation of activities (NSS activities) along with reporting of photographic evidences.	Logbook based certification of competency, journal of visit.	6 hrs
3 rd Professional Year (15 Hrs)	Take history and conduct clinical examination of all family members.	By the end of this visit, students should be able to update the medical history of family members and their vitals and anthropometry.	Family survey, Community clinics.	Community case presentation, OSPE, logbook, journal of visit.	3 hrs
	Organize health check-up and coordinate treatment of adopted family under overall guidance of mentor	By the end of this visit, students should be able to report the details of clinical examination like Hb %, blood group, urine routine and blood sugar along with treatment history of allocated family members.	Community clinics, Multispecialty camps.	Community case presentation, OSPE, logbook, journal of visit.	3 hrs
	Maintain communication & follow up of remedial measures.	By the end of this visit, students should be able to provide details of communication maintained with	Reporting of follow up visits, PRA techniques (transact walk, group	Community case presentation, OSPE, logbook based certification of	3 Hrs.

Professional Year	Competency the student should be able to	Objectives	Suggested Teaching Learning methods	Suggested Assessment methods	Teaching Hours
		family members for follow-up of treatment, and suggested remedial measures along with details of vaccination drive.	discussion) Community clinics.	competency, journal of visit.	
	• take part in environment protection and sustenance activities.	By the end of this visit, students should be able to report the activities undertaken for environment protection and sustenance like study of environment of families, tree plantation/ herbal plantation activities conducted in the village.	Participation in and Process documentation of activities (NSS activities) along with reporting of photographic evidences.	Logbook based certification of competency, journal of visit.	3 hrs
4 th Professional (6 hrs)	• inal counselling of the family members of allotted families and analyze the health trajectory of adopted family under overall guidance of mentor.	By the end of this visit, students should be able to analyze and report the health trajectory of adopted family along with remedial measures adopted at individual, family and community level.	Small group discussion (Report of the health trajectory of adopted family).	Logbook based certification of competency, journal of visit.	6 hrs

6. Assessment

The students learning would be assessed periodically through formative assessments and finally summative assessment through university exams.

6.1 Formative Assessment

The department would conduct formative assessments on a regular basis which would provide timely learning for the students and help them prepare for the summative assessments.

➤ Internal assessment

Guidelines

- Methods that would be followed for the formative assessments are as follows:
 - Modified long essays
 - Short essays
 - Multiple choice questions
 - Seminar presentations
 - Reflective writing
 - Clinico-social case discussions
 - Family study presentation
- Theory internal assessment will be based on the following criteria
 - Written Internal Assessment
 - Seminar
 - Log book documentation
 - Day to Day assessment
 - Professionalism
- Practical internal assessment will be based on the following criteria
 - Written Practical Internal Assessment
 - Clinicosocial presentation during clinical end postings
 - Practical record writing
 - CBTP+ FAP log book
- The department will conduct minimum of three internal assessments i.e. one internal assessment per professional year for both theory and practical.
- At the end of the third professional year, one additional theory internal assessment along the lines of summative university exam will be conducted.
- Remedial IA if required will be conducted at the end for 100 marks covering all portions
- The marks obtained in the internal assessment would be displayed on the notice board within 3 weeks after conducting the tests.
- After the announcement of the internal marks, the students will be given adequate opportunity to review and discuss their evaluated papers with the evaluators within a week's time after which the marks will be finalized.
- *Pass criteria for written theory and practical Internals:* A score of 50% separately in each theory and practical internal assessment would be considered pass.

6.1.1 Theory

Table 4: Mark distribution for theory internals

Written theory IA		Seminar	Log book	Day to day assessment	Professionalism	Total marks
IA	Pre-summative IA					
30	30	10	10	10	10	100

I. Written Theory Internal Assessment

- The theory paper will be conducted for 30 marks / 100 marks.
- One IA for every professional year will be conducted for 30 marks. The best of two will be averaged and accounted for 30 marks
- Pre-summative IA will be conducted at the end of the third professional year for 100 marks and then reduced to 30 marks
- The theory internal assessment would include essay/ modified essay, short essay, short answers and MCQ.

Table 5: Scheme of Theory Internal Assessment

Sl. No	Type of question	Marks for IA	Marks for pre-summative IA
1.	Essay/ Modified essay	$1 \times 10 = 10$	$2 \times 10 = 20$
2.	Short Essay	$2 \times 5 = 10$	$8 \times 5 = 40$
3.	Short answer	$2 \times 3 = 6$	$10 \times 3 = 30$
4.	MCQ	$4 \times 1 = 4$	$10 \times 1 = 10$
Total		30	100*

*** Reduced to 30 for final IA calculation**

- Blue print guidelines will be followed for setting the question paper.
- The distribution of questions would be as follows:
 - 20% of the questions would be of recall type.
 - 40% of the questions would be of comprehension.
 - 40% of the questions would be of application.
- Portions and dates for the internals will be announced atleast 3 weeks' prior for the information of students

Table 6: Portions for theory internals

First IA	• Concept of Health and Disease (CM 01)

	• Relationship of social and behavioural to health and disease (CM 02) • Nutrition (CM 05) • Demography and vital statistics (CM 09)
Second IA	• Environmental health problems (CM 03) • Epidemiology (CM 07) • Occupational Health (CM 11) • Disaster Management (CM 13) • Mental Health (CM 15) • International health (CM 18) • Essential Medicine (CM 19)
Third IA	• Principles of health promotion and education (CM 04) • Basic statistics and its applications (CM 06) • Epidemiology of communicable and non- communicable diseases (CM 08) • Reproductive maternal and child health (CM 10) • Geriatric services (CM 12) • Hospital waste management (CM 14) • Health planning and management (CM 16) • Health care of the community (CM 17) • Recent advances in Community Medicine (CM 20)
Pre Summative IA	All portions
Remedial IA	All portions

II. Seminar

- Students will have to present seminars on topics allotted to them in the third professional year.
- The seminars will be assessed for 10 marks based on the content, presentation and discussion.

III. Log book

- Students have to maintain the Community Medicine log books over the course of the first, second and third professional years.

- The log books will document all activities including SDL conducted in the first, second and third professional years.
- The records will be assessed for completeness, neatness and timely submission.

IV. Day to day Assessment

Day to day assessment of the student would comprise of formative assessments conducted at the end of the lecture series of important topics and the assignments submitted as a part of Self-directed learning.

Table 7: Topics and methods for day to day assessment

Topics	Assessment Method
Concept of Health and Disease (CM 01)	MCQ – Formative assessment
Epidemiology (CM 07)	MCQ- Formative assessment
Reproductive, Maternal and Child Health (CM 10)	MCQ- Formative assessment
Epidemiology of communicable and NCD (CM 08)	MCQ – Formative assessment
Health Care of the Community (CM 17)	MCQ / Assignment – Formative assessment
Occupational Health (CM 11)	SDL – MCQ/ Assignment
Disaster Management (CM 13)	SDL – Assignment
Bio-Statistics (CM 06)	SDL – Exercises / MCQ
Nutrition (CM 05)	SDL - MCQ
International Health agencies (CM 18)	SDL- assignment

V. Professionalism

Professionalism would be assessed throughout the professional years; however, they would be observed specifically for professionalism during the following contacts.

- During their CBTP
- AETCOM
- Clinical posting in Community Medicine (Block Posting)

Table 8: Marking system for Professionalism

CBTP-I (10 marks)	CBTP-II (10 marks)	AETCOM I&II (10 marks)	Block postings (10 marks)	Behavior (10 marks)	Average (10 Marks)
• Punctuality • Team work • Readiness in participating in field work	• Punctuality • Team work • Readiness in participating in field work	• Assessment scores	• Punctuality • Team work • Readiness in participating in field work	Behavior with - teachers - peers - community/ Patients	

6.1.2 Practical

- Three practical internal assessments will be conducted for 30 marks for each professional year.
- Family study and Clinico-Social Case presentation would be assessed at the end of clinical posting.

Table 9: Mark distribution for practical internals

IA	Clinical end posting	Record book (Epidemiology)	FAP + CBTP (log book)	Total marks
60	15	5	20	100

I. Practical Internal Assessment

- One practical internal assessment will be conducted in each professional year
- Paper will be conducted for
 - 1st Year- 20 marks
 - 2nd Year – 20/30 marks
 - 3rd Year – 30 marks
- Weightage of Marks for
 - 1st year- 10 marks
 - 2nd Year- 20 marks
 - 3rd Year – 30 Marks
- Questions consist of problems and spotters on Biostatistics, Epidemiology, Nutrition, Vaccines, Water and Vital statistics

Table 10: Portions for practical internals

1 st IA	2 nd IA	3 rd IA
Problems and Spotters on Nutrition	Problems and Spotters on Entomology	Epidemiology problems Problems on screening Odds ratio and relative risk
Problems on vital statistics	Problems and Spotters on vaccines	Biostatistics
	Problems and Spotters on Water	All Spotters

II. Clinical End-posting

- The student at the end of the clinical postings must demonstrate ability to do the following in relation to common medical problems of the adult in the community:
 1. Demonstrate understanding of the patho-physiologic basis, epidemiological profile, signs and symptoms of disease and their investigation and management at primary health care level.

2. Competently interview and examine the family members / index case and make a clinic social diagnosis.
 3. Interpret and infer from the collected data including available laboratory tests.
 4. Suggest appropriate and cost-effective interventions at individual, family and community level.
 5. Communicate effectively, educate and counsel the individual and the family.
 6. Manage common medical problems and refer if required
- They will be assessed for family study presentation, clinico-social case presentation and record books.
 - The assessment will be for 15 marks.

III. Record Book

- The practical record book will be assessed for 5 marks.
- The records will be assessed for completeness, neatness and timely submission.

IV. FAP and CBTP log book

- a. The log books for the Family Adoption Programme and the Community Based Training Programme will be assessed for 10 marks each.
- b. The log books will document the activities, family studies and reflective writings from the programmes.
- c. The records will be assessed for completeness, neatness and timely submission.

6.2 Summative Assessment

➤ Eligibility criteria for Summative examination

- Learners must secure at least 50% marks of the total marks in Internal Assessment (combined in theory and practical; not less than 40 % marks in theory and practical separately)
- Attendance should be 75% in theory and 80% in practical separately.
- 50% of attendance in AETCOM and FAP.
- Remedial measures in the form of assignments or improvement test would be conducted if any of the students do not fulfil the eligibility criteria.

Table 11: Mark Distribution for summative assessment

Component	Theory	Practical / Clinical/ Viva	Total
Marks	200	100	300

➤ Theory

- 2 papers of 100 marks each.

Table 12: Portions for theory papers

Theory paper I	Theory paper II

Theory paper I	Theory paper II
Concept of Health and Disease (CM 01)	Principles of Health Promotion and Education (CM 04)
Relationship of social and behavioural to health and disease (CM 02)	Epidemiology of communicable and non-communicable diseases (CM 08)
Environmental Health Problems (CM 03)	Occupational Health (CM 11)
Nutrition (CM 05)	Geriatric services (CM12)
Basic Statistics and its Applications (CM 06)	Disaster Management (CM 13)
Epidemiology (CM 07)	Hospital Waste management (CM14)
Demography and vital statistics (CM 09)	Mental Health (CM 15)
Reproductive, Maternal and Child Health (CM 10)	Health Planning and Management (CM 16)
International Health (CM 18)	Health Care of the Community (CM 17)
	Essential Medicines (CM 19)
	Recent Advances In Community Medicine (CM 20)

Table 13: Weightage for Summative Assessment – Paper I

Sl. no	Topic	Marks
1.	Concept of Health and Disease (CM 01)	18
2.	Relationship of social and behavioural to health and disease (CM 02)	08
3.	Environmental Health Problems (CM 03)	12
4.	Nutrition (CM 05)	12
5.	Basic Statistics and its Applications (CM 06)	04
6.	Epidemiology (CM 07)	18
7.	Demography and vital statistics (CM 09)	08
8.	Reproductive, Maternal and Child Health (CM 10)	18
9.	International Health (CM 18)	04

Table 14: Weightage for Summative Assessment – Paper II

Sl. no	Topic	Marks
1.	Principles of Health Promotion and Education (CM 04)	7
2.	Epidemiology of communicable and non- communicable diseases (CM 08)	16 + 16
3.	Occupational Health (CM 11)	7
4.	Geriatric services (CM12)	7
5.	Disaster Management (CM 13)	3
6.	Hospital Waste management (CM14)	7
7.	Mental Health (CM 15)	7
8.	Health Planning and Management (CM 16)	7
9.	Health Care of the Community (CM 17)	16
10.	Essential Medicines (CM 19)	2
11.	Recent Advances in Community Medicine (CM 20)	7

➤ **Practical**

- Family study and Clinico-social case discussion – 35 Marks
- Problems on Biostatistics, Epidemiology, Nutrition, Vaccines, Water, Vital statistics – 35 marks (of which 1/3rd of the questions will be of higher order thinking)
- Spotters – 10 Marks
- Viva - 20 marks

➤ **Pass Criteria:**

- **Mandatory:** The student must secure
 - 50% marks separately in theory and practical (practical = practical/ clinical + viva)

- At least 40% marks in each of the papers with minimum 50% of marks in aggregate (both papers together) to pass.
 - **The internal assessment will appear as a separate subheading in the marks card and not considered for pass criteria of summative examination.**
- **Supplementary Exam:**
- Supplementary exams will be conducted according to the general university guidelines.

7. Recommended List of Text books

1. Park's Textbook of Preventive and Social Medicine – K PARK
2. Community Medicine with Recent Advances- A.H. Suryakantha
3. Text Book of Community Medicine – Rajvir Bhalwar
4. Text Book of Community Medicine – Sundar Lal
5. Essentials of Community medicine practicals – DK Mahabalaraju
6. IAPSM textbook of Community Medicine – A M Kadri
7. Text Book of Community Medicine – DK Mahabalaraju
8. Text Book of Preventive and Social Medicine – B.K. Mahajan and Gupta
9. Text Book of Public Health and Community Medicine –Rajvir Bhalwar
10. National Health Programs – Jugal Kishore
11. Epidemiology – Leon Gordis

8. Syllabus for Community Medicine

8.1 Community Medicine Syllabus for First Professional Year

Table 15: Syllabus for First Professional Year

Sl no	Topic	Lecture	SGD/ DOAP	SDL	Total Hours
1.	Concept of Health and Disease (CM 01)	8	13	1	22
2.	Relationship of social and behavioural to health and disease (CM 02)	4	3	1	8
3.	Nutrition (CM 05)	5	7	2	14
4.	Demography and vital statistics (CM 09)	3	4	1	8
5.	Total Hours	20	27	5	52

Table 16: Competencies for First Professional Year

Competency No.	Competency
Topic: Concept of Health and Disease. The student should be able to	
CM 1.1	Define and describe the concept of Public Health
CM 1.2	Define health; describe the concept of holistic health including concept of spiritual health and the relativeness & determinants of health
CM 1.3	Describe the characteristics of agent, host and environmental factors in health and disease and the multi factorial etiology of disease
CM 1.4	Describe and discuss the natural history of disease
CM 1.5	Describe the application of interventions at various levels of prevention
CM 1.6	Describe and discuss the concepts, the principles of Health promotion and Education, IEC and Behavioral change communication (BCC)
CM 1.7	Enumerate and describe health indicators
CM 1.8	Describe the Demographic profile of India and discuss its impact on health
CM 1.9	Demonstrate the role of effective Communication skills in health in a simulated environment
CM 1.10	Demonstrate the important aspects of the doctor patient relationship in a simulated environment
Topic: Relationship of social and behavior to health and disease. The student should be able to	
CM 2.1	CM2.1Describe the steps and perform clinico socio-cultural and demographic assessment of the individual, family and community
CM 2.2	Describe the socio-cultural factors, family (types), its role in health and disease & demonstrate in a simulated environment the correct assessment of socio-economic status
CM 2.3	Describe and demonstrate in a simulated environment the assessment of barriers to good health and health seeking behavior
CM 2.4	Describe social psychology, community behaviour and community relationship and their impact on health and disease
CM 2.5	Describe poverty and social security measures and its relationship to health and disease

Competency No.	Competency
Topic: NUTRITION. The student should be able to	
CM 5.1	Describe the common sources of various nutrients and special nutritional requirements according to age, sex, activity, physiological conditions
CM5.2	Describe and demonstrate the correct method of performing a nutritional assessment of individuals, families and the community by using the appropriate method
CM 5.3	Define and describe common nutrition related health disorders (including macro-PEM, Micro-iron, Zn, iodine, Vit. A), their control and management
CM 5.4	Plan and recommend a suitable diet for the individuals and families based on local availability of foods and economic status, etc in a simulated environment
CM 5.5	Describe the methods of nutritional surveillance, principles of nutritional education and rehabilitation in the context of sociocultural factors.
CM 5.6	Enumerate and discuss the National Nutrition Policy, important national nutritional Programs including the Integrated Child Development Services Scheme (ICDS) etc
CM 5.7	Describe food hygiene
CM 5.8	Describe and discuss the importance and methods of food fortification and effects of additives and adulteration
Topic: Demography and vital statistics. The student should be able to	
CM 9.1	Define and describe the principles of Demography, Demographic cycle, Vital statistics
CM 9.2	Define, calculate and interpret demographic indices including birth rate, death rate, fertility rates
CM 9.3	Enumerate and describe the causes of declining sex ratio and its social and health implications
CM 9.4	Enumerate and describe the causes and consequences of population explosion and population dynamics of India.
CM 9.5	Describe the methods of population control
CM 9.6	Describe the National Population Policy
CM 9.7	Enumerate the sources of vital statistics including census, SRS, NFHS, NSSO etc

8.2. Community Medicine Syllabus for Second Professional Year

Table 17: Syllabus for Second Professional Year

Sl no	Topic	Lecture	SGD/ DOAP	SDL	Total Hours
1.	Environmental health problems (CM 3)	2	19	2	23
2.	Epidemiology (CM 7)	10	8	2	20
3.	Occupational Health (CM 11)	4	0	1	5
4.	Disaster Management (CM 13)	2	0	2	4
5.	Mental Health (CM 15)	2	2	0	4
6.	International health (CM 18)	0	0	2	2
7.	Essential Medicine (CM 19)	0	1	1	2
8.	TOTAL HOURS	20	30	10	60

Table 18: Competencies for Second Professional Year

Competency no.	Competency
CM 3: Topic: Environmental health problems. The student should be able to	
CM 3.1	Describe the health hazards of air, water, noise, radiation and pollution
CM 3.2	Describe concepts of safe and wholesome water, sanitary sources of water, water purification processes, water quality standards, concepts of water conservation and rainwater harvesting
CM 3.3	Describe the etiology and basis of water borne diseases /jaundice/hepatitis/ diarrheal diseases
CM 3.4	Describe the concept of solid waste, human excreta and sewage disposal
CM 3.5	Describe the standards of housing and the effect of housing on health
CM 3.6	Describe the role of vectors in the causation of diseases. Also discuss National Vector Borne disease Control Program
CM 3.7	Identify and describe the identifying features and life cycles of vectors of Public Health importance and their control measures
CM 3.8	Describe the mode of action, application cycle of commonly used insecticides and rodenticides
CM 7 Topic: Epidemiology. The student should be able to	

Competency no.	Competency
CM 7.1	Define Epidemiology and describe and enumerate the principles, concepts and uses
CM 7.2	Enumerate, describe and discuss the modes of transmission and measures for prevention and control of communicable and noncommunicable diseases
CM 7.3	Enumerate, describe and discuss the sources of epidemiological data
CM 7.4	Define, calculate and interpret morbidity and mortality indicators based on given set of data
CM 7.5	Enumerate, define, describe and discuss epidemiological study designs
CM 7.6	Enumerate and evaluate the need of screening tests
CM 7.7	Describe and demonstrate the steps in the Investigation of an epidemic of communicable disease and describe the principles of control measures
CM 7.8	Describe the principles of association, causation and biases in epidemiological studies
CM 7.9	Describe and demonstrate the application of computers in epidemiology
CM 11 Topic: Occupational Health. The student should be able to	
CM 11.1	Enumerate and describe the presenting features of patients with occupational illness including agriculture
CM 11.2	Describe the role, benefits and functioning of the employees state insurance scheme
CM 11.3	Enumerate and describe specific occupational health hazards, their risk factors and preventive measures
CM 11.4	Describe the principles of ergonomics in health preservation
CM 11.5	Describe occupational disorders of health professionals and their prevention & management
CM 13 Topic: Disaster Management. The student should be able to	
CM 13.1	Define and describe the concept of Disaster management
CM 13.2	Describe disaster management cycle
CM 13.3	Describe man made disasters in the world and in India
CM 13.4	Describe the details of the National Disaster management Authority
CM 15 Topic: Mental Health. The student should be able to	
CM 15.1	Define and describe the concept of mental Health

Competency no.	Competency
CM 15.2	Describe warning signals of mental health disorder
CM 15.3	Describe National Mental Health program
CM 18 Topic: International health. The student should be able to	
CM 18.1	Define and describe the concept of International health
CM 18.2	Describe roles of various international health agencies
CM 19 Topic: Essential Medicine. The student should be able to	
CM 19.1	Define and describe the concept of Essential Medicine List (EML
CM 19.2	Describe roles of essential medicine in primary health care
CM 19.3	Describe counterfeit medicine and its prevention

8.3. Community Medicine Syllabus for Third Professional Year

Table 19: Syllabus for Third Professional Year

Sl no	Topic	Lecture	SGD/ DOAP	SDL	Total Hours
1.	Principles of health promotion and education (CM 04)	3	0	0	3
2.	Basic statistics and its applications (CM 06)	0	12	0	12
3.	Epidemiology of communicable and non-communicable diseases (CM 08)	15	30	01	46
4.	Reproductive maternal and child health (CM 10)	10	10	01	21
5.	Geriatric services (CM 12)	01	02	0	03
6.	Hospital waste management (CM 14)	01	02	01	04
7.	Health planning and management (CM 16)	02	02	0	04
8.	Health care of the community (CM 17)	06	0	01	07
9.	Recent advances in Community Medicine (CM 20)	02	02	01	05
10.	TOTAL HOURS	40	60	05	105

Table 20: Competencies for Third Professional Year

Competency no.	Competency
CM 04 Topic: Principles of health promotion and education. The student should be able to	
CM 4.1	Describe various methods of health education with their advantages and limitations
CM 4.2	Describe the methods of organizing health promotion and education and counselling activities at individual family and community settings
CM 4.3	Demonstrate and describe the steps in evaluation of health promotion and education program
CM 06 Topic: Basic statistics and its applications. The student should be able to	
CM 6.1	Formulate a research question for a study
CM 6.2	Describe and discuss the principles and demonstrate the methods of collection, classification, analysis, interpretation and presentation of statistical data
CM 6.3	Describe, discuss and demonstrate the application of elementary statistical methods including test of significance in various study designs
CM 6.4	Enumerate, discuss and demonstrate Common sampling techniques, simple statistical methods, frequency distribution, measures of central tendency and dispersion
CM 08 Topic: Epidemiology of communicable and non- communicable diseases. The student should be able to	
CM 8.1	Describe and discuss the epidemiological and control measures including the use of essential laboratory tests at the primary care level for communicable diseases
CM 8.2	Describe and discuss the epidemiological and control measures including the use of essential laboratory tests at the primary care level for Non Communicable diseases (diabetes, Hypertension, Stroke, obesity and cancer etc.)
CM 8.3	Enumerate and describe disease specific National Health Programs including their prevention and treatment of a case
CM 8.4	Describe the principles and enumerate the measures to control a disease epidemic
CM 8.5	Describe and discuss the principles of planning, implementing and evaluating control measures for disease at community level bearing in mind the public health importance of the disease
CM 8.6	Educate and train health workers in disease surveillance, control & treatment and health education
CM 8.7	Describe the principles of management of information systems

Competency no.	Competency
CM 10 Topic: Reproductive maternal and child health. The student should be able to	
CM 10.1	Describe the current status of Reproductive, maternal, newborn and Child Health
CM 10.2	Enumerate and describe the methods of screening high risk groups and common health problems
CM 10.3	Describe local customs and practices during pregnancy, childbirth, lactation and child feeding practices
CM 10.4	Describe the reproductive, maternal, newborn & child health (RMCH); child survival and safe motherhood interventions
CM 10.5	Describe Universal Immunization Program; Integrated Management of Neonatal and Childhood Illness (IMNCI) and other existing Programs
CM 10.6	Enumerate and describe various family planning methods, their advantages and shortcomings
CM 10.7	Enumerate and describe the basis and principles of the Family Welfare Program including the organization, technical and operational aspects
CM 10.8	Describe the physiology, clinical management and principles of adolescent health including ARSH
CM 10.9	Describe and discuss gender issues and women empowerment
CM 12 Topic: Geriatric services. The student should be able to	
CM 12.1	Define and describe the concept of Geriatric services.
CM 12.2	Describe health problems of aged population
CM 12.3	Describe the prevention of health problems of aged population
CM 12.4	Describe National program for elderly
CM 14 Topic: Hospital waste management. The student should be able to	
CM 14.1	Define and classify hospital waste
CM 14.2	Describe various methods of treatment of hospital waste
CM 14.3	Describe laws related to hospital waste management
CM 16 Topic: Health planning and management. The student should be able to	
CM 16.1	Define and describe the concept of Health planning

Competency no.	Competency
CM 16.2	Describe planning cycle
CM 16.3	Describe Health management techniques
CM 16.4	Describe health planning in India and National policies related to health and health planning
CM 17 Topic: Health care of the community. The student should be able to	
CM 17.1	Define and describe the concept of health care to community
CM 17.2	Describe community diagnosis
CM 17.3	Describe primary health care, its components and principles
CM 17.4	Describe National policies related to health and health planning and millennium development goals
CM 17.5	Describe health care delivery in India
CM 20 Topic: Recent advances in Community Medicine. The student should be able to	
CM 20.1	List important public health events of last five years
CM 20.2	Describe various issues during outbreaks and their prevention
CM 20.3	Describe any event important to Health of the Community
CM 20.4	Demonstrate awareness about laws pertaining to practice of medicine such as Clinical establishment Act and Human Organ Transplantation Act and its implications

Curriculum for General Medicine 2022



**Ramaiah Medical College
Ramaiah University of Applied Sciences
Bengaluru-560054**

INTRODUCTION TO DEPARTMENT:

DEPARTMENT OF GENERAL MEDICINE

General Medicine is the basis for all clinical subjects. It helps in understanding the basic medical problems, pathogenesis, clinical features, investigation and management for all the medical problems. Hence, strong concepts in General Medicine is required for all the medical students to become a physician of first contact who can provide quality patient care, counselling.

The Department of General Medicine with experienced and competent faculty enable the learning of the students through a robust activity-based curriculum and strong Clinical teaching. The department is well equipped with modern infrastructure. The department is connected with teaching hospital which has inpatients and Out-patient departments, Intensive care units, demonstration rooms. The department has advanced skills lab for simulated teaching with high fidelity manikins.

The teaching faculty of General Medicine are qualified and competent. They are trained to impart quality education. The faculty have excelled in recent advances, research and innovative teaching methodology. The department also promotes student research program to inculcate the basic research methodology concepts.

One of the best practices of the institution-Comprehensive Geriatric care unit which provided holistic care for geriatric patients.

This document provides the required guidelines to implement the CBME curriculum framed by National Medical Commission (NMC) for effective teaching-learning and evaluation of students.

RATIONALE FOR THE PROGRAMME

The purpose of training in General Medicine is to create a physician of first contact who would provide high quality health care and advance the cause of science through research & training. Department of General Medicine aims to train the students as per the guidelines of National Medical Commission. The competency based training programme aims to produce doctors who after undergoing the required training should be able to deal effectively with the needs of the community and should be competent to handle all problems related to General Medicine including recent advances. The student should also acquire skill in teaching of medical/para-medical students in General Medicine that he/she has received his/her training. The student is also expected to know the principles of research methodology and modes of accessing literature.

GOAL - To create a competent physician and Medical teacher:

1. who shall recognise the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national health policy;
2. who shall have mastered most of the competencies, pertaining to the specialty, that are required to be practiced at the secondary and the tertiary levels of the health care delivery system;
3. who shall be aware of the contemporary advances and developments in the discipline concerned;
4. who shall have acquired a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology; and
5. who shall have acquired the basic skills in teaching of the medical and paramedical professionals

EDUCATIONAL AIMS OF THE PROGRAMME - The undergraduate training in General Medicine should enable the student to:

1. Practice efficiently internal medicine specialty, backed by scientific knowledge including basic sciences and skills
2. Diagnose and manage important medical conditions in his specialty (clinically and with the help of relevant investigations).
3. Exercise empathy and a caring attitude and maintain professional integrity, honesty and high ethical standards
4. Plan and deliver comprehensive treatment using the principles of rational drug therapy
5. Plan and advise measures for the prevention and rehabilitation of patients belonging to his specialty;

6. Manage emergencies efficiently by providing Basic Life Support (BLS) and Advanced Life Support (ALS) in emergency situations
7. Recognize conditions that may be outside the area of the specialty/ competence and refer them to an appropriate specialist
8. Demonstrate skills in documentation of case details including epidemiological data
9. Play the assigned role in the implementation of National Health Programs
10. Demonstrate competence in basic concepts of research methodology and clinical epidemiology; and preventive aspects of various disease states
11. Be a motivated 'teacher' - defined as one keen to share knowledge and skills with a colleague or a junior or any learner

CURRICULUM OUTCOMES

CURRICULUM OUTCOME (CO)	
CO-1	Describe the etiopathogenesis, clinical features and differential diagnosis of common medical diseases
CO-2	Elicit adequate history and perform a thorough general physical examination and systemic examination and arrive at a provisional diagnosis.
CO-3	Order appropriate investigations and provide treatment for common medical illnesses.
CO-4	Manage common Medical emergencies and refer when required.
CO-5	Communicate and counsel family members with empathy and professionalism.

(B)Course content

COGNITIVE DOMAIN

BASIC SCIENCES	Applied aspects of Anatomy, Physiology, Biochemistry, Pathology, Haematology and Microbiology and Pharmacology.

	History of medicine Clinical History and examination –Collecting history in detail, carryout clinical examination of various systems & diagnose the condition on clinical grounds. Rational of diagnostic tests – ordering diagnostic tests with prioritising the needs, based on the clinical, hospital and the socio-economic condition of the patient. Concept of Essential Drugs and Rational use of drugs. Communication skills with patients – Learning effective communication skills including compassionate explanation and giving emotional support to the suffering patient and his family. Statistics – Descriptive statistics, analytical statistics, qualitative research methodology, research design and critical review of statistical procedures. Principles of Evidence based medicine – Understanding journal based literature study; the value of text book, reference book articles; the value of review articles; original articles and their assessment. Understanding the value of retrospective, prospective, randomised controlled and blinded studies –the principles including meanings of various bio-statistical tests applied in these studies. Medical Ethics & Social responsibilities of physicians Use of computers in medicine
GENERAL MEDICINE TOPICS	Fluid and electrolyte balance / Acid - Base metabolism – The body fluid compartments, metabolism of water and electrolytes, factors maintaining homeostasis, diagnosis and management of acidosis and alkalosis & Electrolyte imbalance. Blood transfusion: – Blood grouping, cross matching, component therapy, complications of blood transfusion, blood substitutes. Shock and Multi-organ Failure:- Types of shock, diagnosis, resuscitation pharmacological support, ARDS, ventilator support and its prevention.
INFECTIOUS DISEASES	Basic considerations: - Host- parasite interactions, Immunisation principles, Lab diagnosis of infectious diseases, Vaccination (BCG, Typhoid, Tetanus, Hepatitis A & B), Antimicrobial agents, Mol. Mechanism of microbial pathogenesis. Clinical Syndromes (Community setting): - Septic shock, Infective endocarditis, PUO, Infectious diarrhoea, Bacterial Food Poisoning, Common STD Syndromes, Inf. Complications of Bites and stings, Infections of skin, muscle and soft tissue, Osteomyelitis, Intra-abdominal infections and abscess, P.I.D. Nosocomial Infections: Hospital Acquired infections, Infections in Transplant pts, Infection control in hospital. Bacterial Infections: Pneumococcal, Staphylococcal, Streptococcal & Enterococcal, Tetanus, Diphtheria, Anthrax, Listeria, Gas gangrene,

	Botulism, Other clostridial infections. Meningococcal, H.pylori, Salmonella, Shigella, Cholera, Legionella, Moraxella Brucella, Pseudomonas, Mixed anaerobic infections, H. influenza, Gonococcal, Pertussis, Plague, Campylobacter, Donovanosis, Actinomycosis. Anaerobic infections Microbacterial diseases: Tuberculosis, Leprosy, Non-tubercular mycobacterium. Spirochaetal: Syphilis, Leptospirosis, Endemic trepanomatosiis. Rickettsiae: R.M. Spotted fevers Mycoplasma: M. pneumoniae Chlamydia: Psittacosis Fungal Infections: Candidiasis, P.carinii, Aspergillosis, Mucormycosis, Coccidioidomycosis, Cryptococcosis, Histoplasmosis. Viral Infections: Antiviral chemotherapy, DNA viruses: Herpes simplex, CMV, Chicken pox vaccinia, other pox viruses. Varicella zoster, Parvovirus, Epstein Barr, HPV, DNA & RNA respiratory viruses: Influenza, RNA Viruses: Rabies, ARBO viruses (dengue, KFD, Japanese encephalitis), Human retrovirus, Enterovirus, Mumps, Rubella HIV & AIDS: - Epidemiology, clinical stages, complications, opportunistic infections(OI), laboratory investigations, HAART, PEP & counselling. Protozoal and Helminthic infections : Life History, Clinical Manifestations, lab. diagnosis and therapy, Amoebiasis, Malaria, Giardiasis, Taeniasis, Echinococcosis, E.vermicularis, T. trichiura, Ascariasis, Hookworm infections, Filariasis, Leishmaniasis, Other free living amoeba, Toxoplasmosis, Trichinella, Trypanosomiasis, Trichomoniasis, H.nana, D.latum, Schistosomiasis, Larva migrans syndrome.
CARDIO VASCULAR DISEASES	Rheumatic Fever & heart diseases Congenital heart diseases Atherosclerosis, coronary artery disease Primary and Secondary hypertension Cardiac failure Cardiac arrhythmias – tachy & brady arrhythmias, heart blocks Infective endocarditis Myocardial & Pericardial diseases Pregnancy and heart diseases Diseases of aorta DVT and pulmonary embolism Peripheral arterial and venous diseases Acute and Chronic cor-pulmonale Disease of Lymphatic system Noncardiac surgery in cardiac patients - assessment for anaesthesia and surgery Cardiac drugs and drug interaction Guidelines published by standard cardiology journals. Apart from pathophysiology, clinical features and management, the importance of primary and secondary prevention must be stressed. Clinical cardiology. Adequate exposure to cardiac OPD work, cardiology ward work and coronary care unit: During the posting, the student should accompany his cases for stress-ECG (TMT), echocardiography and cath lab.
RESPIRATORY MEDICINE	Applied aspects of Respiratory system & Respiratory Physiology. Mycobacteriology: Diagnostic methods, pathogenesis of Mycobacterial diseases, their clinical manifestations. Pulmonary and extra pulmonary, as well as disseminated tuberculosis, its pathogenesis, clinical features, diagnosis and management, National programme on Tuberculosis including DOTS. Non tuberculous Respiratory infection: Community and hospital acquired pneumonias, infections of tracheo-bronchial tree including cystic fibrosis, parasitic and fungal diseases of lungs, HIV infections and lungs. Allergic diseases of respiratory system

	including bronchial asthma. Interstitial, industrial, occupational lung diseases including Interstitial Pulmonary Fibrosis. Suppurative lung diseases Granulomatous diseases of lungs including sarcoidosis. Pulmonary manifestations of systemic diseases and drug induced lung diseases. Tropical pulmonary eosinophilia Diseases of pluera, mediastinum and diaphragm. Intra-thoracic malignancies including etiology, diagnosis, staging and management of lung cancer. Sarcoidosis
CENTRAL NERVOUS SYSTEM	Applied aspects of anatomy -Brain and Spinal cord Evaluation of CNS diseases Clinical approach to: - Coma, Headache, Seizure, Dementia, Aphasia, Sleep disorders Brain death , Cerebrovascular diseases Cranial Nerve disorders CNS infections, Bacterial, Viral, Fungal, Neuro-tuberculosis, parasitic. Motor system diseases Tumors of Brain and Spinal cord, Extrapyrarnidal disorders, Cerebellar disorders Demyelinating diseases Neuro-degenerative disorders Nutritional disorders affecting nervous system, Cerebrovascular anomalies Peripheral Neurites, polynurites & Guillain Barre Syndrome, Cervical Spondylosis Disorders of muscle-Dystrophy, Myopathies & Myasthenic syndrome
GASTRO INTESTINAL & HEPATOBILIARY SYSTEM	Disease of Oesphagus, Peptic ulcer disease and its management Upper Gastrointestinal bleed, Lower Gastrointestinal bleed, Approach to Mal-absorption and Mal-digestion Inflammatory bowel diseases, Irritable Bowel Syndrome (I.B.S.), Gastrointestinal motility disorders Chronic Diarrhoea Disorders of Peritoneum G.I function tests Bilirubin metabolism, Cirrhosis of Liver, Biliary Cirrhosis & N.C.P.F& Budd Chiari syndrome, Acute & Chronic Hepatitis- Viral, Toxic Alcoholic Liver Disease, Amoebic Liver Abscess Obstructive Jaundice, Acute & Chronic Hepatic insufficiency Cong. Hyperbilirubinemias, Tumours of the liver, Drugs and Liver . Diseases of Gall bladder AC & Chronic cholecystitis Gall Stone, Diseases and disorders of Pancreas :- Acute & Chronic Pancreatitis
ENDOCRINOLOGY & METABOLISM	Principles of Endocrinology : Mechanism of action of hormones & receptors Assessment of endocrine function, Hypothalamus & Pituitary : Approach to pituitary disease, diseases of anterior & posterior-pituitary tumors, Acromegaly, short stature, pr olactinoma, diabetes insipidus, SIADH, Cushing's disease, Panhypopituitarism, Sheehan's syndrome, Non secretary adenoma. Pancreas : Hypoglycemia, Insulinomia .Diabetes Mellitus : Prevalence, Etiopathogenesis, ADA criteria for diagnosis, ADA classification, Clinical features, investigations, Complications-micro & macro-vascular, Management-Diet, Exercise, oral hypoglycemics, Insulin therapy in Type 1 & type 2, Gestational diabetes, Diabetic keto-acidosis, HONK, Hypoglycemia

	Thyroid : Iodine metabolism, Iodine deficiency disorder, Synthesis and secretion of thyroid hormone, hypothyroidism, hyperthyroidism, Cretinism, Sick euthyroid syndrome, thyroiditis, evaluations of nodule, ca. thyroid. Parathyroid : Primary hyperparathyroidism, Hypoparathyroidism, Tetany, Pseudohypoparathyroidism. Adrenal :– Steroid biochemistry, Addison’s disease, Cushing’s syndrome, Congenital adrenal hyperplasia, Pheochromocytoma, primary aldosteronism. Gonads: – testes – Men- Hypogonadism – PGAS, hypogonadotropic (Kallman’s syndrome), Hypergonadotropic (Klinefelter’s syndrome), delayed puberty, precocious puberty, infertility. Ovary : Delayed puberty – Turner’s syndrome, polycystic ovarian disease, Hirsutism, precocious puberty, approach to amenorrhea, postmenopausal syndrome, current concepts in management
SEXUAL MEDICINE	Applied aspects of anatomy and physiology of Reproductive system – male & female. Etiology, Clinical features and management of common sexual problems – male & female. Effects of psychiatric illness and systemic diseases including commonly used drugs on reproductive system. Infertility – male & female – etiology, clinical features, investigations and Physician’s role in management.
METABOLIC BONE DISORDERS (MBD)	Bone mineral, metabolism, osteoporosis -Osteomalacia & rickets Carcinoid tumours, hyperlipidemia
NEPHROLOGY	Evaluation of patient with renal diseases Interpretation of laboratory tests Acute renal failure Chronic renal failure pathogenesis, pathology, clinical features conservative management Diet in renal failure Acute glomerulonephritis including idiopathic GN Nephrotic syndrome Urinary tract infection Drugs and kidney Nephrolithiasis and obstructive disorder Renal involvement in systemic diseases Diabetic nephropathy Pregnancy and kidney Basics of renal transplantation Organ donation Concept of brain death and cadaveric transplantation Electrolyte disturbance and its management Immuno- suppressive drugs Slow continuous renal replacement therapy
HAEMATOLOGY	Haemotopoiesis Anaemias- causes, clinical features and laboratory approach and treatment. Iron deficiency, megaloblastic, haemolytic and aplastic anaemias. Various thalasemic syndromes, Hb Electrophoresis. Polycythaemias. Problem of Iron over load Autoimmune blood disorders Transfusion medicine Recognition and management of Transfusion disorders Transfusion in patients with Hematological diseases (component therapy) Coagulopathy Hypercoagulable state Leukaemias and its managements Myelodysplastic syndromes and Myeloproliferative disorders Platelet disorders-Purpuras - Primary & sec. Therapeutic plasmapheresis and Cytophoresis. ABVP,

	CHOP Chemotherapy.
RHEUMATOLOGY AND CONNECTIVE TISSUE DISORDERS	Structure of connective tissue – collagen, elastin & proteoglycans Immunological mechanisms & Immunogen in Rheumatoid arthritis SLE Osteo arthritis Vasculitis Sero negative spondyloarthropathy Crystal arthritis Inflammatory /metabolic myopathies Arthropathies associated with Endocrine diseases Haematologic diseases Malignant diseases Fibromyalgic syndromes Low back pain Systemic sclerosis Myositis Mixed connective Tissue disorder (MCTD)
EMERGENCY MEDICINE	Basic & Advanced Life Support Shock Syndromes Anaphylaxis Acid base imbalance Multi organ failure, Poisoning – OP compound, sedatives Basics of mechanical ventilation, Transfusion reaction, Upper G.I hemorrhage Upper airway obstruction Tension Pneumothorax Acute asthma, ARDS Cardiac arrest Cardiac Tamponade Hypertensive emergencies & urgencies Status epilepticus Coma in Diabetes Endocrinal emergencies Cerebral Malaria Emergencies in cancer Infections in ICU Antibiotic usage in ICU Enteral & Parental Nutrition Brain death List of Skills Cardiopulmonary resuscitation / cardio-version / defibrillation Emergent airway intubation Central venous cannulation Arterial cannulation Mechanical ventilation
MEDICAL ONCOLOGY	Basics of Oncology Normal cell, Cancer cell- Cell cycle & its Regulation, Molecular Biology Techniques such as Southern blot, Northern blot, Western blot, Karyotyping , FISH, PCR. Metastatic cascade, Angiogenesis, Basic principles of Chemotherapy, Drug classification, Drug action Side effects, Radiotherapy Structure of Atom, radioactivity and its effect on cell, side effects Clinical oncology, Hematologic Cancers, Hematopoiesis, Leukemias & Lymphomas – Classification, Diagnosis, management Solid tumors - Br.Carcinoma, Hepatomas, MM- Principles of Management Blood component therapy, Bone Marrow transplant, Newer Modalities in Therapy & Supportive Care , Biologic Response Modifiers Gene therapy, Stem cell

	transplant, Newer antibiotics, Nutritional support Growth factors
RADIO DIAGNOSIS	General:-The importance and scope of different radiological examinations in the diagnosis, treatment and management of various diseases. Newer imaging modalities: Different imaging modalities including the newer imaging techniques - ultrasonography, colour doppler imaging, colour flow mapping, Computed Tomography, MRI, Nuclear imaging, PET and SPECT- basic principles Protocols to be followed while referring for various routine investigations Barium studies, Ultrasonography, Computed tomography, MRI imaging, Nuclear medicine investigations Various contrast investigations and contrast materials used in imaging techniques and adverse reactions. Interpretation of plain, contrast X-rays, Ultrasonography, CT,MRI & NM
PSYCHIATRY	Delirium and dementia, Misuse of and dependence on - alcohol and drugs, Schizophrenia and related - (including acute and - chronic delusional disorders, Depressive and manic disorders of all degrees of severity, Acute reactions to stress, PTSD, and adjustment disorders - (including reactions to terminal illness and normal and abnormal grief) Anxiety, phobic and obsessional - disorders - Somatoform disorders Disorders of eating sleeping, - Clinical presentations psychosexual functions - Principles of management of uncomplicated cases Personality disorders - Concepts of personality and personality disorders, Influence on physical and mental illnesses Mental retardation - Principles of prevention Recognition of the most common syndromes Principles of management Childhood psychiatric disorders - Common psychiatric disorders of childhood and adolescence Principles of management, Old age psychiatric disorders - Impact of aging on health and psychiatric illness, Recognition and principles of management of psychiatric disorders in the elderly, Suicide - Assessment of risk, Management of potentially suicidal patients
DERMATOLOGY / STD	The skin manifestations of various diseases:- Leprosy, STD, HIV, Systemic infections and infestations Internal malignancy Drug reactions, Systemic diseases with skin manifestation Psoriasis, Vitiligo, Fungal infections, Lichen planus Viral , bacterial infections Cutaneous metastasis Panniculitis
NUTRITION	RDA of nutritional substances, nutritional assessment, nutritional recall, metabolic response to stress, malnutrition, PCM, nutritional deficiency states, nutritional response in stress, enteral and parenteral nutrition, dietary advice in obesity, DM, renal, hepatic failure, hyperlipidaemia, IHD
ENVIRONMENT AND TOXINS	Poisoning: - OP compound, sedatives, alcohol, corrosives, anti-convulsant, general principles of management & specific management of poisons including snakes bites, scorpion stings. Toxicology – Heavy metal poisoning, Fluorosis, Lathyrism, Heat stroke, Heat exhaustion, Hypothermia, High altitude pulmonary oedema.
GENETICS	Genetics: - Basic principles of genetics, molecular basis of genetics, genetic engineering, human genome mapping, chromosomal disorders, genetic basis of cancer, genetic & gene therapy. Immunology: - Basics in immunology, Auto immune disorders, immune

	deficiency diseases, hypersensitivity reactions – anaphylaxis, angioedema, adverse drug reactions, Complement, HLA system. Transplantation immunology.
RECENT ADVANCES	The students should gain the knowledge regarding all the newer advances happening in the field of Medicine. Newer drugs, technologies, treatment modalities, guidelines, awards, national and international programmes.

PSYCHOMOTOR DOMAIN

Elicit a detailed clinical history

Perform a thorough physical examination of all the systems

Demonstrate Mantoux test

Demonstrate sampling of blood for culture

Demonstrate IV- Infusions, Intravenous injections, Intravenous canulation

Demonstrate ECG recording and interpret ECG

Demonstrate Pleural tap , Lumbar puncture

Demonstrate Cardio Pulmonary Resuscitation (CPR)

Blood and blood components matching and transfusions

Demonstrate Arterial puncture for ABG

List the indications and contraindications for Bone marrow aspiration and biopsy and demonstrate the procedure.

Demonstrate Abdominal paracentesis - diagnostic

Demonstrate the steps involved in Nebulization, Inhaler therapy, Oxygen delivery

Demonstrate Endotracheal intubation in a manikin.

Demonstrate Feeding tube/Ryle's tube, stomach wash Naso-gastric intubation in a manikin

Demonstrate Urinary catheterization – male and female in a manikin

Demonstrate Urine protein, sugar, microscopy, Peripheral blood smear, Malarial smear

Demonstrate Ziehl Nielson smear-sputum, gastric aspirate Gram's stain smear-CSF, pus

AFFECTIVE DOMAIN

Skill of history taking

Active and positive listening . Empathy.

Non-verbal communication.

Art of history taking in handicapped individuals like deaf , elderly, aphasics. Ascertaining life history and life style.

Tactful elicitation of personal and confidential History.

Carry out meticulous general & systemic examination. Specific areas of examination based on clues in the history. Make a personality assessment.

Information, evaluation skills, (interpretation).

Diagnostic formulation and differential diagnosis.

Evaluate, role of personal and social factors contributing to the patient's behavior pattern.

Formulate plan of management which includes referral to a specialist, whenever appropriate.

Information-giving skills.

Pass information to promote health.

Explain the implication of diagnosis to patient as well as the family. Inform the patient about beneficial aspects and also potential adverse effects of treatment.

Philosophical approach to life and death.

Reporting skills. Report verbally or in writing or any other media of communication To medical colleagues.To lay people.

To Non-medical agencies involved in patient care.

Promote public education.

Promote skills in case reporting and publication of data. Promote compliance with prescribed treatment.

Basic prescribing skills for medical disorders commonly encountered (rational drug prescribing skills.)

Recognise earliest adverse effects of treatment and distinguish them from those of symptoms of illness.

Learning skills. Sustained self-directed independent learning. Keeping abreast with advances in medical

practice. Internalising the concept of life long learning.

Access to computer usage, including internet browsing.

Critical appraisal of latest and best information and data analysis. Skills of using library facilities (including electronic media).

Team work skills. Co-operate with: Medical colleagues, Non-medical health care workers, Patient and his family organizations, Community services. Non-Governmental Organisations & General Public. List of clinical, procedural and practical skills.

1.

(D) COMPETENCY LIST

Topic: Heart Failure		Number of competencies: (30)			
IM1.1	Describe and discuss the epidemiology, pathogenesis clinical evolution and course of common causes of heart disease including: rheumatic/ valvular, ischemic, hypertrophic inflammatory	K	KH	Y	Lecture, Small group discussion
IM1.2	Describe and discuss the genetic basis of some forms of heart failure	K	KH	N	Lecture, Small group discussion
IM1.3	Describe and discuss the aetiology microbiology pathogenesis and clinical evolution of rheumatic fever, criteria, degree of rheumatic activity and rheumatic valvular heart disease and its complications including infective endocarditis	K	KH	Y	Lecture, Small group discussion
IM1.4	Stage heart failure	K	KH	Y	Lecture, Small group discussion
IM1.5	Describe ,discuss and differentiate the processes involved in R Vs L heart failure, systolic vs diastolic failure	K	KH	Y	Lecture, Small group discussion
IM1.6	Describe and discuss the compensatory mechanisms involved in heart failure including cardiac remodelling and neurohormonal adaptations	K	KH	Y	Lecture, Small group discussion
IM1.7	Enumerate, describe and discuss the factors that exacerbate heart failure, dietary factors drugs etc.	K	KH	Y	Lecture, Small group discussion
IM1.8	Describe and discuss the pathogenesis and development of common arrhythmias involved in heart failure particularly atrial fibrillation	K	KH	Y	Lecture, Small group discussion
IM1.9	Describe and discuss the clinical presentation and features, diagnosis, recognition and management of acute rheumatic fever	K	KH	Y	Lecture, Small group discussion

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM1.10	Elicit document and present an appropriate history that will establish the diagnosis, cause and severity of heart failure including: presenting complaints, precipitating and exacerbating factors, risk factors exercise tolerance, changes in sleep patterns, features suggestive of infective endocarditis	S	SH	Y	Bedside clinic	Skill assessment			
IM1.11	Perform and demonstrate a systematic examination based on the history that will help establish the diagnosis and estimate its severity including: measurement of pulse, blood pressure and respiratory rate, jugular venous forms and pulses, peripheral pulses, conjunctiva and fundus, lung, cardiac examination including palpation and auscultation with identification of heart sounds and murmurs, abdominal distension and splenic palpation	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM1.12	Demonstrate peripheral pulse, volume, character, quality and variation in various causes of heart failure	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM1.13	Measure the blood pressure accurately, recognise and discuss alterations in blood pressure in valvular heart disease and other causes of heart failure and cardiac tamponade	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM1.14	Demonstrate and measure jugular venous distension	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM1.15	Identify and describe the timing, pitch quality conduction and significance of precordial murmurs and their variations	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM1.16	Generate a differential diagnosis based on the clinical presentation and prioritise it based on the most likely diagnosis	K	KH	Y	Bedside clinic, Small group discussion	Skill assessment			
IM1.17	Order and interpret diagnostic testing based on the clinical diagnosis including 12 lead ECG, Chest radiograph, blood cultures	K	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM1.18	Perform and interpret a 12 lead ECG	S	P	Y	Bedside clinic, DOAP session	Skill assessment	3		
IM1.19	Enumerate the indications for and describe the findings of heart failure with the following conditions including: 2D echocardiography, brain natriuretic peptide, exercise testing, nuclear medicine testing and coronary angiogram	S	KH	N	Lecture, Small group discussion, Bedside clinic	Skill assessment		Radiodiagnosis	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM1.20	Determine the severity of valvular heart disease based on the clinical and laboratory and imaging features and determine the level of intervention required including surgery	C	SH	Y	Small group discussion, Lecture, Bedside clinic	Written/ Skill assessment			
IM1.21	Describe and discuss and identify the clinical features of acute and subacute endocarditis, echocardiographic findings, blood culture and sensitivity and therapy	K	KH/SH	Y	Bedside clinic, Small group discussion, Lecture	Skill assessment			
IM1.22	Assist and demonstrate the proper technique in collecting specimen for blood culture	S	SH	Y	DOAP session	Skill assessment		Microbiology	
IM1.23	Describe, prescribe and communicate non pharmacologic management of heart failure including sodium restriction, physical activity and limitations	S/C	SH	Y	Lecture, Small group discussion	Skill assessment			
IM1.24	Describe and discuss the pharmacology of drugs including indications, contraindications in the management of heart failure including diuretics, ACE inhibitors, Beta blockers, aldosterone antagonists and cardiac glycosides	K	KH	Y	Lecture, Small group discussion	Viva voce/written		Pharmacology	
IM1.25	Enumerate the indications for valvuloplasty, valvotomy, coronary revascularization and cardiac transplantation	K	KH	Y	Lecture, Small group discussion, Bedside clinic	Viva voce/written			
IM1.26	Develop document and present a management plan for patients with heart failure based on type of failure, underlying aetiology	S	SH	Y	Bedside clinic, Skill assessment, Small group discussion	Bedside clinic/ Skill assessment/written			
IM1.27	Describe and discuss the role of penicillin prophylaxis in the prevention of rheumatic heart disease	K	KH	Y	Bedside clinic, Small group discussion	Written		Microbiology, Pharmacology	
IM1.28	Enumerate the causes of adult presentations of congenital heart disease and describe the distinguishing features between cyanotic and acyanotic heart disease	K	KH	Y	Bedside clinic, Small group discussion	Bedside clinic/ Skill assessment/written			
IM1.29	Elicit document and present an appropriate history, demonstrate correctly general examination, relevant clinical findings and formulate document and present a management plan for an adult patient presenting with a common form of congenital heart disease	K	KH	Y	Bedside clinic, Small group discussion	Skill assessment/ written			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM1.30	Administer an intramuscular injection with an appropriate explanation to the patient	S	SH	Y	Bedside clinic, Skill assessment	Log book documentation of completion		Pharmacology	
Topic: Acute Myocardial Infarction/ IHD Number of competencies: (24) Number of procedures that require certification : (02)									
IM2.1	Discuss and describe the epidemiology, antecedents and risk factors for atherosclerosis and ischemic heart disease	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, Physiology, Community Medicine	
IM2.2	Discuss the aetiology of risk factors both modifiable and non modifiable of atherosclerosis and IHD	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, Physiology	
IM2.3	Discuss and describe the lipid cycle and the role of dyslipidemia in the pathogenesis of atherosclerosis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Physiology, Biochemistry	
IM2.4	Discuss and describe the pathogenesis natural history, evolution and complications of atherosclerosis and IHD	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, Physiology	
IM2.5	Define the various acute coronary syndromes and describe their evolution, natural history and outcomes	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM2.6	Elicit document and present an appropriate history that includes onset evolution, presentation risk factors, family history, comorbid conditions, complications, medication, history of atherosclerosis, IHD and coronary syndromes	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM2.7	Perform, demonstrate and document a physical examination including a vascular and cardiac examination that is appropriate for the clinical presentation	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM2.8	Generate document and present a differential diagnosis based on the clinical presentation and prioritise based on “cannot miss”, most likely diagnosis and severity	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM2.9	Distinguish and differentiate between stable and unstable angina and AMI based on the clinical presentation	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM2.10	Order, perform and interpret an ECG	S	P	Y	Bedside clinic, DOAP session	Skill assessment	3		

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM2.11	Order and interpret a Chest X-ray and markers of acute myocardial infarction	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM2.12	Choose and interpret a lipid profile and identify the desirable lipid profile in the clinical context	S	SH	Y	Bedside clinic, DOAP session	Skill assessment		Biochemistry	
IM2.13	Discuss and enumerate the indications for and findings on echocardiogram, stress testing and coronary angiogram	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM2.14	Discuss and describe the indications for admission to a coronary care unit and supportive therapy for a patient with acute coronary syndrome	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM2.15	Discuss and describe the medications used in patients with an acute coronary syndrome based on the clinical presentation	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	
IM2.16	Discuss and describe the indications for acute thrombolysis, PTCA and CABG	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM2.17	Discuss and describe the indications and methods of cardiac rehabilitation	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM2.18	Discuss and describe the indications, formulations, doses, side effects and monitoring for drugs used in the management of dyslipidemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology, Biochemistry	
IM2.19	Discuss and describe the pathogenesis, recognition and management of complications of acute coronary syndromes including arrhythmias, shock, LV dysfunction, papillary muscle rupture and pericarditis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM2.20	Discuss and describe the assessment and relief of pain in acute coronary syndromes	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	
IM2.21	Observe and participate in a controlled environment an ACLS program	S	KH	N	DOAP session	NA			
IM2.22	Perform and demonstrate in a mannequin BLS	S	P	Y	DOAP session	Skill assessment	1		

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM2.23	Describe and discuss the indications for nitrates, anti platelet agents, gpIIb IIIa inhibitors, beta blockers, ACE inhibitors etc in the management of coronary syndromes	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	
IM2.24	Counsel and communicate to patients with empathy lifestyle changes in atherosclerosis / post coronary syndromes	C/A	SH	Y	DOAP session	Skill assessment		AETCOM	
Topic: Pneumonia Number of competencies: (19) Number of procedures that require certification: (NIL)									
IM3.1	Define, discuss, describe and distinguish community acquired pneumonia, nosocomial pneumonia and aspiration pneumonia	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Human Anatomy, Pathology, Microbiology	
IM3.2	Discuss and describe the aetiologies of various kinds of pneumonia and their microbiology depending on the setting and immune status of the host	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Microbiology	
IM3.3	Discuss and describe the pathogenesis, presentation, natural history and complications of pneumonia	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Pathology, Microbiology	
IM3.4	Elicit document and present an appropriate history including the evolution, risk factors including immune status and occupational risk	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM3.5	Perform, document and demonstrate a physical examination including general examination and appropriate examination of the lungs that establishes the diagnosis, complications and severity of disease	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM3.6	Generate document and present a differential diagnosis based on the clinical features, and prioritise the diagnosis based on the presentation	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM3.7	Order and interpret diagnostic tests based on the clinical presentation including: CBC, Chest X ray PA view, Mantoux, sputum gram stain, sputum culture and sensitivity, pleural fluid examination and culture, HIV testing and ABG	S	SH	Y	Bedside clinic, DOAP session	Skill assessment		Radiodiagnosis, Microbiology	

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Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM4.1	Describe and discuss the febrile response and the influence of host immune status, risk factors and comorbidities on the febrile response	K	K	Y	Lecture, Small group discussion	Written		Microbiology	
IM4.2	Describe and discuss the influence of special populations on the febrile response including: the elderly, immune suppression, malignancy and neutropenia, HIV and travel	K	K	Y	Lecture, Small group discussion	Written		Microbiology	
IM4.3	Discuss and describe the common causes, pathophysiology and manifestations of fever in various regions in India including bacterial, parasitic and viral causes (e.g.Dengue, Chikungunya, Typhus)	K	K	Y	Lecture, Small group discussion	Written		Microbiology, Community Medicine	
IM4.4	Describe and discuss the pathophysiology and manifestations of inflammatory causes of fever	K	KH	Y	Lecture, Small group discussion	Written		Microbiology	
IM4.5	Describe and discuss the pathophysiology and manifestations of malignant causes of fever including hematologic and lymph node malignancies	K	KH	Y	Lecture, Small group discussion	Written		Pathology, Microbiology	
IM4.6	Discuss and describe the pathophysiology and manifestations of malaria	K	KH	Y	Lecture, Small group discussion	Written		Microbiology	
IM4.7	Discuss and describe the pathophysiology and manifestations of the sepsis syndrome	K	K	Y	Lecture, Small group discussion	Written			
IM4.8	Discuss and describe the pathophysiology, aetiology and clinical manifestations of fever of unknown origin (FUO) including in a normal host, neutropenic host, nosocomial host and a host with HIV disease	K	K	Y	Lecture, Small group discussion	Written		Microbiology	
IM4.9	Elicit document and present a medical history that helps delineate the aetiology of fever that includes the evolution and pattern of fever, associated symptoms, immune status, comorbidities, risk factors, exposure through occupation, travel and environment and medication use	S	SH	Y	Bedside clinic, DOAP session	Skill assessment		Microbiology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM4.10	Perform a systematic examination that establishes the diagnosis and severity of presentation that includes: general skin mucosal and lymph node examination, chest and abdominal examination (including examination of the liver and spleen)	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM4.11	Generate a differential diagnosis and prioritise based on clinical features that help distinguish between infective, inflammatory, malignant and rheumatologic causes	K	SH	Y	Bedside clinic, DOAP session	Written/ Viva voce			
IM4.12	Order and interpret diagnostic tests based on the differential diagnosis including: CBC with differential, peripheral smear, urinary analysis with sediment, Chest X ray, blood and urine cultures, sputum gram stain and cultures, sputum AFB and cultures, CSF analysis, pleural and body fluid analysis, stool routine and culture and QBC	K	SH	Y	Bedside clinic, Skill assessment	Skill assessment		Pathology, Microbiology	
IM4.13	Perform and interpret a sputum gram stain	S	SH	Y	DOAP session	Log book/ documentation		Microbiology	
IM4.14	Perform and interpret a sputum AFB	S	SH	Y	DOAP session	Log book/ documentation		Microbiology	
IM4.15	Perform and interpret a malarial smear	S	SH	Y	DOAP session	Log book/ documentation/ Skill assessment		Microbiology	
IM4.16	Enumerate the indications and describe the findings in tests of inflammation and specific rheumatologic tests, serologic testing for pathogens including HIV, bone marrow aspiration and biopsy	K	KH	N	Lecture, Small group discussion	Written		Pathology	
IM4.17	Observe and assist in the performance of a bone marrow aspiration and biopsy in a simulated environment	S	SH	N	Skills lab	Log book/ documentation/ DOAP session		Pathology	
IM4.18	Enumerate the indications for use of imaging in the diagnosis of febrile syndromes	K	KH	N	Lecture, Small group discussion	Written/ Viva voce			
IM4.19	Assist in the collection of blood and wound cultures	S	SH	Y	DOAP session	Log book/ documentation		Microbiology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM4.20	Interpret a PPD (Mantoux)	S	SH	Y	DOAP session	Log book/ documentation		Microbiology	
IM4.21	Develop and present an appropriate diagnostic plan based on the clinical presentation, most likely diagnosis in a prioritised and cost effective manner	K	KH	Y	Bedside clinic, Skill assessment	Skill assessment			
IM4.22	Describe and discuss the pharmacology, indications, adverse reactions, interactions of antimalarial drugs and basis of resistance	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	
IM4.23	Prescribe drugs for malaria based on the species identified, prevalence of drug resistance and national programs	S	SH	Y	Small group discussion	Skill assessment		Microbiology, Pharmacology	
IM4.24	Develop an appropriate empiric treatment plan based on the patient's clinical and immune status pending definitive diagnosis	C	SH	Y	DOAP session	Skill assessment			
IM4.25	Communicate to the patient and family the diagnosis and treatment	C	SH	Y	DOAP session	Skill assessment		AETCOM	
IM4.26	Counsel the patient on malarial prevention	C	SH	Y	DOAP session	Skill assessment		Microbiology, Pharmacology	
Topic: Liver disease Number of competencies: (18) Number of procedures that require certification : (NIL)									
IM5.1	Describe and discuss the physiologic and biochemical basis of hyperbilirubinemia	K	K	Y	Lecture, Small group discussion	Written/Viva voce		Pathology, Physiology	
IM5.2	Describe and discuss the aetiology and pathophysiology of liver injury	K	K	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, Physiology	
IM5.3	Describe and discuss the pathologic changes in various forms of liver disease	K	K	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM5.4	Describe and discuss the epidemiology, microbiology, immunology and clinical evolution of infective (viral) hepatitis	K	K	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, Microbiology	
IM5.5	Describe and discuss the pathophysiology and clinical evolution of alcoholic liver disease	K	K	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM5.6	Describe and discuss the pathophysiology, clinical evolution and complications of cirrhosis and portal hypertension including ascites, spontaneous bacterial peritonitis, hepatorenal syndrome and hepatic encephalopathy	K	K	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM5.7	Enumerate and describe the causes and pathophysiology of drug induced liver injury	K	K	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, Pharmacology	
IM5.8	Describe and discuss the pathophysiology, clinical evolution and complications cholelithiasis and cholecystitis	K	K	Y	Lecture, Small group discussion	Written/ Viva voce		General Surgery	
IM5.9	Elicit document and present a medical history that helps delineate the aetiology of the current presentation and includes clinical presentation, risk factors, drug use, sexual history, vaccination history and family history	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM5.10	Perform a systematic examination that establishes the diagnosis and severity that includes nutritional status, mental status, jaundice, abdominal distension ascites, features of portosystemic hypertension and hepatic encephalopathy	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM5.11	Generate a differential diagnosis and prioritise based on clinical features that suggest a specific aetiology for the presenting symptom	K	KH	Y	Bedside clinic, DOAP session	Skill assessment/ Viva voce			
IM5.12	Choose and interpret appropriate diagnostic tests including: CBC, bilirubin, function tests, Hepatitis serology and ascitic fluid examination in patient with liver diseases.	S	KH	Y	Bedside clinic, DOAP session	Skill assessment		Pathology	
IM5.13	Enumerate the indications for ultrasound and other imaging studies including MRCP and ERCP and describe the findings in liver disease	K	K	Y	Bedside clinic, Small group discussion	Viva voce/ Written		Radiodiagnosis	General Surgery
IM5.14	Outline a diagnostic approach to liver disease based on hyperbilirubinemia, liver function changes and hepatitis serology	S	SH	Y	Bedside clinic, Small group discussion	Viva voce/ Written		Pathology, Microbiology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM5.15	Assist in the performance and interpret the findings of an ascitic fluid analysis	S	KH	Y	DOAP session	documentation in log book			
IM5.16	Describe and discuss the management of hepatitis, cirrhosis, portal hypertension, ascites spontaneous, bacterial peritonitis and hepatic encephalopathy	K	KH	Y	Written, Small group discussion	Skill assessment/ Written/ Viva voce		Pharmacology	General Surgery
IM5.17	Enumerate the indications, precautions and counsel patients on vaccination for hepatitis	K/C	SH	Y	Written, Small group discussion	Written/ Viva voce		Microbiology	
IM5.18	Enumerate the indications for hepatic transplantation	K	K	Y	Written, Small group discussion	Written/ Viva voce			General Surgery
Topic: HIV Number of competencies: (23) Number of procedures that require certification : (NIL)									
IM6.1	Describe and discuss the symptoms and signs of acute HIV seroconversion	K	KH	Y	Lecture, Small group discussion	Short note/ Viva voce		Microbiology	
IM6.2	Define and classify HIV AIDS based on the CDC criteria	K	KH	Y	Lecture, Small group discussion	Short notes/ Viva voce		Microbiology	
IM6.3	Describe and discuss the relationship between CDC count and the risk of opportunistic infections	K	KH	Y	Lecture, Small group discussion	Short notes/ Viva voce		Microbiology	
IM6.4	Describe and discuss the pathogenesis, evolution and clinical features of common HIV related opportunistic infections	K	KH	Y	Lecture, Small group discussion	Short notes/ Viva voce		Microbiology	
IM6.5	Describe and discuss the pathogenesis, evolution and clinical features of common HIV related malignancies	K	KH	Y	Lecture, Small group discussion	Short notes/ Viva voce		Pathology, Microbiology	
IM6.6	Describe and discuss the pathogenesis, evolution and clinical features of common HIV related skin and oral lesions	K	KH	Y	Lecture, Small group discussion	Short notes/ Viva voce		Pathology, Microbiology	
IM6.7	Elicit document and present a medical history that helps delineate the aetiology of the current presentation and includes risk factors for HIV, mode of infection, other sexually transmitted diseases, risks for opportunistic infections and nutritional status	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM6.8	Generate a differential diagnosis and prioritise based on clinical features that suggest a specific aetiology for the presenting symptom	S	SH	Y	Bedside clinic, DOAP session, Small group discussion	Skill assessment			
IM6.9	Choose and interpret appropriate diagnostic tests to diagnose and classify the severity of HIV-AIDS including specific tests of HIV, CDC	K	KH	Y	Bedside clinic, DOAP session, Small group discussion	Written/ Skill assessment		Pathology, Microbiology	
IM6.10	Choose and interpret appropriate diagnostic tests to diagnose opportunistic infections including CBC, sputum examination and cultures, blood cultures, stool analysis, CSF analysis and Chest radiographs	S	KH	Y	Bedside clinic, DOAP session, Small group discussion	Written/ Skill assessment			
IM6.11	Enumerate the indications and describe the findings for CT of the chest and brain and MRI	K	K	N	Small group discussion, Lecture, Bedside clinic	Written/ Viva voce		Radiodiagnosis	
IM6.12	Enumerate the indications for and interpret the results of: pulse oximetry, ABG, Chest Radiograph	K	KH	Y	Bedside clinic, DOAP session, Small group discussion	Written/ Skill assessment			
IM6.13	Describe and enumerate the indications and side effects of drugs for bacterial, viral and other types of diarrhea	K	K	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology, Microbiology	
IM6.14	Perform and interpret AFB sputum	S	P	Y	DOAP session	Skill assessment		Microbiology	
IM6.15	Demonstrate in a model the correct technique to perform a lumbar puncture	S	SH	Y	Simulation	Skill assessment		Microbiology	
IM6.16	Discuss and describe the principles of HAART, the classes of antiretrovirals used, adverse reactions and interactions	K	K	Y	Lecture, Small group discussion	Written/ Viva voce		Microbiology, Pharmacology	
IM6.17	Discuss and describe the principles and regimens used in post exposure prophylaxis	K	K	Y	Lecture, Small group discussion	Written/ Viva voce		Microbiology, Pharmacology	
IM6.18	Enumerate the indications and discuss prophylactic drugs used to prevent HIV related opportunistic infections	K/C	K	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, Microbiology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM6.19	Counsel patients on prevention of HIV transmission	C	SH	Y	DOAP session	Skills assessment		AETCOM	
IM6.20	Communicate diagnosis, treatment plan and subsequent follow up plan to patients	C	SH	Y	DOAP session	Skills assessment		AETCOM	
IM6.21	Communicate with patients on the importance of medication adherence	C	SH	Y	DOAP session	Skills assessment		AETCOM	
IM6.22	Demonstrate understanding of ethical and legal issues regarding patient confidentiality and disclosure in patients with HIV	K/A	SH	Y	DOAP session, Small group discussion	Viva voce/ Written/ Skill Assessment		AETCOM	
IM6.23	Demonstrate a non-judgemental attitude to patients with HIV and to their lifestyles	A	SH	Y	Small group discussion	observation by teacher		AETCOM	
Topic: Rheumatologic problems Number of competencies: (27) Number of procedures that require certification: (NIL)									
IM7.1	Describe the pathophysiology of autoimmune disease	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM7.2	Describe the genetic basis of autoimmune disease	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM7.3	Classify cause of joint pain based on the pathophysiology	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM7.4	Develop a systematic clinical approach to joint pain based on the pathophysiology	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Orthopedics
IM7.5	Describe and discriminate acute, subacute and chronic causes of joint pain	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Orthopedics
IM7.6	Discriminate, describe and discuss arthralgia from arthritis and mechanical from inflammatory causes of joint pain	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Orthopedics
IM7.7	Discriminate, describe and discuss distinguishing articular from periarticular complaints	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Orthopedics
IM7.8	Determine the potential causes of joint pain based on the presenting features of joint involvement	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Orthopedics

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM7.9	Describe the common signs and symptoms of articular and periarticular diseases	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Orthopedics
IM7.10	Describe the systemic manifestations of rheumatologic disease	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM7.11	Elicit document and present a medical history that will differentiate the aetiologies of disease	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM7.12	Perform a systematic examination of all joints, muscle and skin that will establish the diagnosis and severity of disease	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			Orthopedics
IM7.13	Generate a differential diagnosis and prioritise based on clinical features that suggest a specific aetiology	K/S	KH	Y	Bedside clinic, Small group discussion	Skill assessment/ Written			
IM7.14	Describe the appropriate diagnostic work up based on the presumed aetiology	K	KH	Y	Bedside clinic, Small group discussion	Skill assessment/ Written			
IM7.15	Enumerate the indications for and interpret the results of : CBC, anti- CCP, RA, ANA, DNA and other tests of autoimmunity	K	SH	Y	Bedside clinic, Small group discussion	Skill assessment/ Written		Pathology	
IM7.16	Enumerate the indications for arthrocentesis	K	K	Y	Small group discussion, Lecture	Written/ Viva voce			Orthopedics
IM7.17	Enumerate the indications and interpret plain radiographs of joints	K	SH	Y	Bedside clinic, Small group discussion	Skill assessment/ Written		Radiodiagnosis	Orthopedics
IM7.18	Communicate diagnosis, treatment plan and subsequent follow up plan to patients	C	SH	Y	DOAP session	Skill assessment/ Written			
IM7.19	Develop an appropriate treatment plan for patients with rheumatologic diseases	K	KH	Y	Bedside clinic, Small group discussion	Skill assessment/ Written			
IM7.20	Select, prescribe and communicate appropriate medications for relief of joint pain	K/C	SH	Y	DOAP session	Skill assessment/ Written		Pharmacology	Orthopedics
IM7.21	Select, prescribe and communicate preventive therapy for crystalline arthropathies	K/C	SH	Y	DOAP session	Skill assessment/ Written		Pharmacology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM7.22	Select, prescribe and communicate treatment option for systemic rheumatologic conditions	K/C	SH	Y	DOAP session	Skill assessment/ Written		Pharmacology	
IM7.23	Describe the basis for biologic and disease modifying therapy in rheumatologic diseases	K	KH	Y	Bedside clinic, Small group discussion	Skill assessment/ Written		Pharmacology	
IM7.24	Communicate and incorporate patient preferences in the choice of therapy	C/A	SH	Y	DOAP session	Skill assessment		AETCOM	
IM7.25	Develop and communicate appropriate follow up and monitoring plans for patients with rheumatologic conditions	C	SH	Y	DOAP session	Skill assessment			
IM7.26	Demonstrate an understanding of the impact of rheumatologic conditions on quality of life, well being, work and family	A	SH	Y	DOAP session	Skill assessment			
IM7.27	Determine the need for specialist consultation	K	K	Y	Small group discussion, Lecture	Viva voce			
Topic: Hypertension Number of competencies: (20) Number of procedures that require certification: (NIL)									
IM8.1	Describe and discuss the epidemiology, aetiology and the prevalence of primary and secondary hypertension	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, Physiology	
IM8.2	Describe and discuss the pathophysiology of hypertension	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, Physiology	
IM8.3	Describe and discuss the genetic basis of hypertension	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM8.4	Define and classify hypertension	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM8.5	Describe and discuss the differences between primary and secondary hypertension	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM8.6	Define, describe and discuss and recognise hypertensive urgency and emergency	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM8.7	Describe and discuss the clinical manifestations of the various aetiologies of secondary causes of hypertension	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM8.8	Describe, discuss and identify target organ damage due to hypertension	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM8.9	Elicit document and present a medical history that includes: duration and levels, symptoms, comorbidities, lifestyle, risk factors, family history, psychosocial and environmental factors, dietary assessment, previous and concomitant therapy	K	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM8.10	Perform a systematic examination that includes : an accurate measurement of blood pressure, fundus examination, examination of vasculature and heart	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM8.11	Generate a differential diagnosis and prioritise based on clinical features that suggest a specific aetiology	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM8.12	Describe the appropriate diagnostic work up based on the presumed aetiology	K	KH	Y	Small group discussion	Skill assessment/ Written/ Viva voce			
IM8.13	Enumerate the indications for and interpret the results of : CBC, Urine routine, BUN, Cr, Electrolytes, Uric acid, ECG	K	KH	Y	Small group discussion	Skill assessment/ Written/ Viva voce			
IM8.14	Develop an appropriate treatment plan for essential hypertension	K	KH	Y	Small group discussion	Written/ Viva voce		Pharmacology	
IM8.15	Recognise, prioritise and manage hypertensive emergencies	S	SH	Y	DOAP session	Skill assessment/ Written		Pharmacology	
IM8.16	Develop and communicate to the patient lifestyle modification including weight reduction, moderation of alcohol intake, physical activity and sodium intake	C	SH	Y	DOAP session	Skill assessment			
IM8.17	Perform and interpret a 12 lead ECG	S	P	Y	DOAP session	documentation in log book/ skills station			
IM8.18	Incorporate patient preferences in the management of HTN	A/C	SH	Y	DOAP session	Skill assessment			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM8.19	Demonstrate understanding of the impact of Hypertension on quality of life, well being, work and family	A	SH	Y	Bedside clinic, DOAP session	observation by faculty			
IM8.20	Determine the need for specialist consultation	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
Topic: Anemia Number of competencies: (21) Number of procedures that require certification : (NIL)									
IM9.1	Define, describe and classify anemia based on red blood cell size and reticulocyte count	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM9.2	Describe and discuss the morphological characteristics, aetiology and prevalence of each of the causes of anemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM9.3	Elicit document and present a medical history that includes symptoms, risk factors including GI bleeding, prior history, medications, menstrual history, and family history	S	SH	Y	Bed side clinic, DOAP session	Skill assessment			
IM9.4	Perform a systematic examination that includes : general examination for pallor, oral examination, DOAP session of hyper dynamic circulation, lymph node and splenic examination	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM9.5	Generate a differential diagnosis and prioritise based on clinical features that suggest a specific aetiology	S	SH	Y	Bedside clinic, DOAP session	Skill assessment/ Written		Pathology	
IM9.6	Describe the appropriate diagnostic work up based on the presumed aetiology	S	SH	Y	Bedside clinic, DOAP session	Skill assessment/ Written		Pathology	
IM9.7	Describe and discuss the meaning and utility of various components of the hemogram	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce/ Skill assessment		Pathology	
IM9.8	Describe and discuss the various tests for iron deficiency	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce/ Skill assessment		Pathology	
IM9.9	Order and interpret tests for anemia including hemogram, red cell indices, reticulocyte count, iron studies, B12 and folate	S	SH	Y	Bedside clinic, DOAP session	Skill assessment/ Written		Pathology	
IM9.10	Describe, perform and interpret a peripheral smear and stool occult blood	S	SH	P	Bedside clinic, DOAP session	Skill assessment/ Written		Pathology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM9.11	Describe the indications and interpret the results of a bone marrow aspirations and biopsy	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce/ Skill assessment		Pathology	
IM9.12	Describe, develop a diagnostic plan to determine the aetiology of anemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce/ Skill assessment		Pathology	
IM9.13	Prescribe replacement therapy with iron, B12, folate	S	SH	Y	Bedside clinic, DOAP session	Skill assessment/ Written		Pharmacology	
IM9.14	Describe the national programs for anemia prevention	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology, Community Medicine	
IM9.15	Communicate the diagnosis and the treatment appropriately to patients	C	SH	Y	DOAP session	Skill assessment			
IM9.16	Incorporate patient preferences in the management of anemia	C	SH	Y	DOAP session	Skill assessment			
IM9.17	Describe the indications for blood transfusion and the appropriate use of blood components	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce/ Skill assessment		Pathology	
IM9.18	Describe the precautions required necessary when performing a blood transfusion	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce/ Skill assessment			
IM9.19	Assist in a blood transfusion	S	SH	Y	Bedside clinic	document in log book			
IM9.20	Communicate and counsel patients with methods to prevent nutritional anemia	C	SH	Y	DOAP session	Skill assessment			
IM9.21	Determine the need for specialist consultation	K	KH	Y	Lecture, Small group discussion	Written			
Topic: Acute Kidney Injury and Chronic renal failure Number of competencies: (31) Number of procedures that require certification: (NIL)									
IM10.1	Define, describe and differentiate between acute and chronic renal failure	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM10.2	Classify, describe and differentiate the pathophysiologic causes of acute renal failure	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM10.3	Describe the pathophysiology and causes of pre renal ARF, renal and post renal ARF	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM10.4	Describe the evolution, natural history and treatment of ARF	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM10.5	Describe and discuss the aetiology of CRF	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM10.6	Stage Chronic Kidney Disease	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM10.7	Describe and discuss the pathophysiology and clinical findings of uraemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM10.8	Classify, describe and discuss the significance of proteinuria in CKD	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM10.9	Describe and discuss the pathophysiology of anemia and hyperparathyroidism in CKD	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM10.10	Describe and discuss the association between CKD glycemia and hypertension	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM10.11	Describe and discuss the relationship between CAD risk factors and CKD and in dialysis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM10.12	Elicit document and present a medical history that will differentiate the aetiologies of disease, distinguish acute and chronic disease, identify predisposing conditions, nephrotoxic drugs and systemic causes	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM10.13	Perform a systematic examination that establishes the diagnosis and severity including determination of volume status, presence of edema and heart failure, features of uraemia and associated systemic disease	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM10.14	Generate a differential diagnosis and prioritise based on clinical features that suggest a specific aetiology	K	KH	Y	DOAP session, Small group discussion	Skill assessment/ Written/ Viva voce			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM10.15	Describe the appropriate diagnostic work up based on the presumed aetiology	K	SH	Y	DOAP session, Small group discussion	Skill assessment/ Written/ Viva voce			
IM10.16	Enumerate the indications for and interpret the results of : renal function tests, calcium, phosphorus, PTH, urine electrolytes, osmolality, Anion gap	K	KH	Y	DOAP session, Small group discussion	Skill assessment/ Written/ Viva voce		Pathology	
IM10.17	Describe and calculate indices of renal function based on available laboratories including FENa (Fractional Excretion of Sodium) and CrCl (Creatinine Clearance)	S	SH	Y	DOAP session, Small group discussion	Skill assessment/ Written/ Viva voce		Pathology	
IM10.18	Identify the ECG findings in hyperkalemia	S	SH	Y	DOAP session, Small group discussion	Skill assessment/ Written/ Viva voce			
IM10.19	Enumerate the indications and describe the findings in renal ultrasound	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Radiodiagnosis	
IM10.20	Describe and discuss the indications to perform arterial blood gas analysis: interpret the data	S	P	Y	DOAP session	documentation in log book			
IM10.21	Describe and discuss the indications for and insert a peripheral intravenous catheter	S	P	Y	DOAP session, Bedside clinic	documentation in logbook			
IM10.22	Describe and discuss the indications, demonstrate in a model and assist in the insertion of a central venous or a dialysis catheter	S	SH	N	DOAP session	Skill assessment with model			
IM10.23	Communicate diagnosis treatment plan and subsequent follow up plan to patients	C	SH	Y	DOAP session	Skill assessment			
IM10.24	Counsel patients on a renal diet	K	SH	Y	DOAP session	Skill assessment			
IM10.25	Identify and describe the priorities in the management of ARF including diet, volume management, alteration in doses of drugs, monitoring and indications for dialysis	K/C	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	
IM10.26	Describe and discuss supportive therapy in CKD including diet, anti hypertensives, glycemic therapy, dyslipidemia, anemia, hyperkalemia, hyperphosphatemia and secondary hyperparathyroidism	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM10.27	Describe and discuss the indications for renal dialysis	C/A	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM10.28	Describe and discuss the indications for renal replacement therapy	C	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM10.29	Describe discuss and communicate the ethical and legal issues involved in renal replacement therapy	C/A	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM10.30	Recognise the impact of CKD on patient's quality of life well being work and family	A	K	Y	Lecture, Small group discussion, Bedside clinic	observation by faculty			
IM10.31	Incorporate patient preferences in to the care of CKD	A/C	KH	Y	Lecture, Small group discussion, Bedside clinic	observation by faculty			
Topic: Diabetes Mellitus Number of competencies: (24) Number of procedures that require certification : (02)									
IM11.1	Define and classify diabetes	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM11.2	Describe and discuss the epidemiology and pathogenesis and risk factors and clinical evolution of type 1 diabetes	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM11.3	Describe and discuss the epidemiology and pathogenesis and risk factors economic impact and clinical evolution of type 2 diabetes	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM11.4	Describe and discuss the genetic background and the influence of the environment on diabetes	K	KH	N	Lecture, Small group discussion	Written/ Viva voce			
IM11.5	Describe and discuss the pathogenesis and temporal evolution of microvascular and macrovascular complications of diabetes	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM11.6	Describe and discuss the pathogenesis and precipitating factors, recognition and management of diabetic emergencies	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM11.7	Elicit document and present a medical history that will differentiate the aetiologies of diabetes including risk factors, precipitating factors, lifestyle, nutritional history, family history, medication history, co-morbidities and target organ disease	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM11.8	Perform a systematic examination that establishes the diagnosis and severity that includes skin, peripheral pulses, blood pressure measurement, fundus examination, detailed examination of the foot (pulses, nervous and deformities and injuries)	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM11.9	Describe and recognise the clinical features of patients who present with a diabetic emergency	K	KH	Y	Small group discussion, Lecture	Written/ Viva voce			
IM11.10	Generate a differential diagnosis and prioritise based on clinical features that suggest a specific aetiology	K	KH	Y	Small group discussion, Lecture	Written/ Viva voce			
IM11.11	Order and interpret laboratory tests to diagnose diabetes and its complications including: glucoses, glucose tolerance test, glycosylated hemoglobin, urinary micro albumin, ECG, electrolytes, ABG, ketones, renal function tests and lipid profile	S	SH	Y	Bedside clinic, DOAP session	Skill assessment		Pathology	
IM11.12	Perform and interpret a capillary blood glucose test	S	P	Y	Bedside clinic, DOAP session	Skill assessment	2	Pathology, Biochemistry	
IM11.13	Perform and interpret a urinary ketone estimation with a dipstick	S	P	Y	Bedside clinic, DOAP session	Skill assessment	2	Pathology, Biochemistry	
IM11.14	Recognise the presentation of hypoglycaemia and outline the principles on its therapy	K	KH	Y	Small Group discussion, Lecture	Written/ Viva voce			
IM11.15	Recognise the presentation of diabetic emergencies and outline the principles of therapy	K	KH	Y	Small Group discussion, Lecture	Written/ Viva voce			
IM11.16	Discuss and describe the pharmacologic therapies for diabetes their indications, contraindications, adverse reactions and interactions	K	KH	Y	Small Group discussion, Lecture	Written/ Viva voce		Pharmacology	
IM11.17	Outline a therapeutic approach to therapy of T2Diabetes based on presentation, severity and complications in a cost effective manner	K	KH	Y	Small Group discussion, Lecture	Written/ Viva voce			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM11.18	Describe and discuss the pharmacology, indications, adverse reactions and interactions of drugs used in the prevention and treatment of target organ damage and complications of Type II Diabetes including neuropathy, nephropathy, retinopathy, hypertension, dyslipidemia and cardiovascular disease	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	
IM11.19	Demonstrate and counsel patients on the correct technique to administer insulin	S/C	SH	Y	DOAP session	Skill assessment		Pharmacology	
IM11.20	Demonstrate to and counsel patients on the correct technique of self monitoring of blood glucoses	S/C	SH	Y	DOAP session	Skill assessment			
IM11.21	Recognise the importance of patient preference while selecting therapy for diabetes	A	KH	Y	DOAP session	faculty observation			
IM11.22	Enumerate the causes of hypoglycaemia and describe the counter hormone response and the initial approach and treatment	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, Physiology	
IM11.23	Describe the precipitating causes, pathophysiology, recognition, clinical features, diagnosis, stabilisation and management of diabetic ketoacidosis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM11.24	Describe the precipitating causes, pathophysiology, recognition, clinical features, diagnosis, stabilisation and management of Hyperosmolar non ketotic state	K	KH	N	Lecture, Small group discussion	Written/ Viva voce			
Topic: Thyroid dysfunction Number of competencies: (15) Number of procedures that require certification : (NIL)									
IM12.1	Describe the epidemiology and pathogenesis of hypothyroidism and hyperthyroidism including the influence of iodine deficiency and autoimmunity in the pathogenesis of thyroid disease	K	K	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, Physiology	
IM12.2	Describe and discuss the genetic basis of some forms of thyroid dysfunction	K	K	N	Lecture, Small group discussion	Written/ Viva voce			
IM12.3	Describe and discuss the physiology of the hypothalamopituitary - thyroid axis, principles of thyroid function testing and alterations in physiologic function	K	K	Y	Lecture, Small group discussion	Short notes		Pathology, Physiology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM12.4	Describe and discuss the principles of radio iodine uptake in the diagnosis of thyroid disorders	K	KH	Y	Lecture, Small group discussion	Short notes/ Viva voce			
IM12.5	Elicit document and present an appropriate history that will establish the diagnosis cause of thyroid dysfunction and its severity	S	SH	Y	Bedside clinic	Skill assessment/ Short case			
IM12.6	Perform and demonstrate a systematic examination based on the history that will help establish the diagnosis and severity including systemic signs of thyrotoxicosis and hypothyroidism, palpation of the pulse for rate and rhythm abnormalities, neck palpation of the thyroid and lymph nodes and cardiovascular findings	S	SH	Y	Bed side clinic, DOAP session	Skill assessment			General Surgery
IM12.7	Demonstrate the correct technique to palpate the thyroid	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			General Surgery
IM12.8	Generate a differential diagnosis based on the clinical presentation and prioritise it based on the most likely diagnosis	K	KH	Y	Bedside clinic, small group discussion	Short case			General Surgery
IM12.9	Order and interpret diagnostic testing based on the clinical diagnosis including CBC, thyroid function tests and ECG and radio iodine uptake and scan	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			General Surgery
IM12.10	Identify atrial fibrillation, pericardial effusion and bradycardia on ECG	S	SH	Y	Bedside clinic, lab	Skill assessment			General Surgery
IM12.11	Interpret thyroid function tests in hypo and hyperthyroidism	S	SH	Y	Bedside clinic, lab	Skill assessment			General Surgery
IM12.12	Describe and discuss the iodisation programs of the government of India	K	KH	Y	Lecture, Bedside clinic	Short note		Community Medicine	
IM12.13	Describe the pharmacology, indications, adverse reaction, interactions of thyroxine and antithyroid drugs	K	KH	Y	Lecture, Small group discussion	Viva voce/ Short note		Pharmacology	General Surgery
IM12.14	Write and communicate to the patient appropriately a prescription for thyroxine based on age, sex, and clinical and biochemical status	S/C	SH	Y	Skill assessment	Skill assessment		Pharmacology	
IM12.15	Describe and discuss the indications of thionamide therapy, radio iodine therapy and surgery in the management of thyrotoxicosis	K	KH	Y	Bedside clinic, Small group discussion	Short note/ Viva voce		Pharmacology	General Surgery

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
Topic: Common malignancies		Number of competencies: (19)			Number of procedures that require certification : (NIL)				
IM13.1	Describe the clinical epidemiology and inherited & modifiable risk factors for common malignancies in India	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Pathology, Biochemistry	
IM13.2	Describe the genetic basis of selected cancers	K	K	N	Lecture, Small group discussion	Short note/ Viva voce		Pathology	
IM13.3	Describe the relationship between infection and cancers	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Pathology, Microbiology	
IM13.4	Describe the natural history, presentation, course, complications and cause of death for common cancers	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Pathology	
IM13.5	Describe the common issues encountered in patients at the end of life and principles of management	K	K	N	Lecture, Small group discussion	Short note/ Viva voce			
IM13.6	Describe and distinguish the difference between curative and palliative care in patients with cancer	K	K	N	Lecture, Small group discussion	Short note/ Viva voce		Pharmacology	
IM13.7	Elicit document and present a history that will help establish the aetiology of cancer and includes the appropriate risk factors, duration and evolution	S	K	Y	Bedside clinic	Skill assessment/ Short case			General Surgery
IM13.8	Perform and demonstrate a physical examination that includes an appropriate general and local examination that excludes the diagnosis, extent spread and complications of cancer	S	SH	Y	Bedside clinic	Skill assessment/ short case			General Surgery
IM13.9	Demonstrate in a mannequin the correct technique for performing breast exam, rectal examination and cervical examination and pap smear	S	K	Y	Bedside clinic	Skill assessment/ Short case		Human Anatomy	General Surgery
IM13.10	Generate a differential diagnosis based on the presenting symptoms and clinical features and prioritise based on the most likely diagnosis	S	K	Y	Bedside clinic	Skill assessment/ Short case			General Surgery
IM13.11	Order and interpret diagnostic testing based on the clinical diagnosis including CBC and stool occult blood and prostate specific antigen	S	K	Y	Bedside clinic	Skill assessment/ Short case			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM13.12	Describe the indications and interpret the results of Chest X Ray, mammogram, skin and tissue biopsies and tumor markers used in common cancers	K	KH	Y	Bedside clinic, Small group discussion	Short note/ Viva voce		Radiodiagnosis	
IM13.13	Describe and assess pain and suffering objectively in a patient with cancer	K	KH	Y	Bedside clinic, Small group discussion	Short note/ Viva voce		Pharmacology	General Surgery
IM13.14	Describe the indications for surgery, radiation and chemotherapy for common malignancies	K	KH	Y	Bedside clinic, Small group discussion	Short note/ Viva voce		Pharmacology	General Surgery
IM13.15	Describe the need, tests involved, their utility in the prevention of common malignancies	K	KH	Y	Bedside clinic, Small group discussion	Short note/ Viva voce		Pathology	
IM13.16	Demonstrate an understanding and needs and preferences of patients when choosing curative and palliative therapy	A/C	KH	Y	Bedside clinic, small group discussion	Short note/ Viva voce		AETCOM	
IM13.17	Describe and enumerate the indications, use, side effects of narcotics in pain alleviation in patients with cancer	K	KH	Y	Bedside clinic, Small group discussion	Short note/ Viva voce		Pharmacology	Anesthesiology
IM13.18	Describe and discuss the ethical and the medico legal issues involved in end of life care	K	KH	Y	Bedside clinic, Small group discussion	Short note/ Viva voce		AETCOM	
IM13.19	Describe the therapies used in alleviating suffering in patients at the end of life	K	KH	Y	Bedside clinic, Small group discussion	Short note/ Viva voce		AETCOM	
Topic: Obesity Number of competencies: (15) Number of procedures that require certification: (NIL)									
IM14.1	Define and measure obesity as it relates to the Indian population	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce			
IM14.2	Describe and discuss the aetiology of obesity including modifiable and non-modifiable risk factors and secondary causes	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Pathology	
IM14.3	Describe and discuss the monogenic forms of obesity	K	K	N	Lecture, Small group discussion	Short note/ Viva voce		Pathology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM14.4	Describe and discuss the impact of environmental factors including eating habits, food, work, environment and physical activity on the incidence of obesity	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Pathology, Community Medicine	
IM14.5	Describe and discuss the natural history of obesity and its complications	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Pathology	
IM14.6	Elicit and document and present an appropriate history that includes the natural history, dietary history, modifiable risk factors, family history, clues for secondary causes and motivation to lose weight	S	SH	Y	Bedside clinic, Skills lab	Skill assessment			
IM14.7	Perform, document and demonstrate a physical examination based on the history that includes general examination, measurement of abdominal obesity, signs of secondary causes and comorbidities	S	SH	Y	Bedside clinic, Skills lab	Skill assessment			
IM14.8	Generate a differential diagnosis based on the presenting symptoms and clinical features and prioritise based on the most likely diagnosis	S	SH	Y	Bedside clinic, Skills lab	Skill assessment/ Short note/ Viva voce			
IM14.9	Order and interpret diagnostic tests based on the clinical diagnosis including blood glucose, lipids, thyroid function tests etc.	S	SH	Y	Bedside clinic, Skills lab, Small group discussion	Skill assessment/ Short note/ Viva voce			
IM14.10	Describe the indications and interpret the results of tests for secondary causes of obesity	K	KH	Y	Bedside clinic, Skills lab, Small group discussion	Skill assessment/ Short note/ Viva voce			
IM14.11	Communicate and counsel patient on behavioural, dietary and lifestyle modifications	C	SH	Y	Bedside clinic, Skills lab	Skill assessment			
IM14.12	Demonstrate an understanding of patient's inability to adhere to lifestyle instructions and counsel them in a non - judgemental way	A/C	SH	Y	Bedside clinic, Skills lab	Skill assessment			
IM14.13	Describe and enumerate the indications, pharmacology and side effects of pharmacotherapy for obesity	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Pharmacology	
IM14.14	Describe and enumerate the indications and side effects of bariatric surgery	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce			General Surgery

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM14.15	Describe and enumerate and educate patients, health care workers and the public on measures to prevent obesity and promote a healthy lifestyle	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce			
Topic: GI bleeding Number of competencies: (18) Number of procedures that require certification : (NIL)									
IM15.1	Enumerate, describe and discuss the aetiology of upper and lower GI bleeding	K	KH	Y	Lecture, Small group discussion	Short note/ Viva voce		Pathology	General Surgery
IM15.2	Enumerate, describe and discuss the evaluation and steps involved in stabilizing a patient who presents with acute volume loss and GI bleed	S	SH	Y	DOAP session, Small group discussion, Lecture	Written/ Viva voce/ Skill assessment		Pathology	General Surgery
IM15.3	Describe and discuss the physiologic effects of acute blood and volume loss	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Pathology, Physiology	General Surgery
IM15.4	Elicit and document and present an appropriate history that identifies the route of bleeding, quantity, grade, volume loss, duration, etiology, comorbid illnesses and risk factors	S	SH	Y	Bedside clinic	Skill assessment			General Surgery
IM15.5	Perform, demonstrate and document a physical examination based on the history that includes general examination, volume assessment and appropriate abdominal examination	S	SH	Y	Bedside clinic, Skills lab	Skill assessment			General Surgery
IM15.6	Distinguish between upper and lower gastrointestinal bleeding based on the clinical features	S	KH	Y	Lecture, Small group discussion	Short note/ Viva voce			General Surgery
IM15.7	Demonstrate the correct technique to perform an anal and rectal examination in a mannequin or equivalent	S	SH	Y	DOAP session	Skill assessment			General Surgery
IM15.8	Generate a differential diagnosis based on the presenting symptoms and clinical features and prioritise based on the most likely diagnosis	S	SH	Y	Bedside clinic, Skills lab	Skill assessment/ Short note/ Viva voce			General Surgery
IM15.9	Choose and interpret diagnostic tests based on the clinical diagnosis including complete blood count, PT and PTT, stool examination, occult blood, liver function tests, H.pylori test.	S	SH	Y	Bedside clinic, DOAP session, Small group discussion	Skill assessment/ Short note/ Viva voce		Pathology	General Surgery

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM15.10	Enumerate the indications for endoscopy, colonoscopy and other imaging procedures in the investigation of Upper GI bleeding	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Surgery
IM15.11	Develop, document and present a treatment plan that includes fluid resuscitation, blood and blood component transfusion, and specific therapy for arresting blood loss	S	KH	Y	Lecture, Small group discussion	Short note/ Viva voce		Pathology	General Surgery
IM15.12	Enumerate the indications for whole blood, component and platelet transfusion and describe the clinical features and management of a mismatched transfusion	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Pathology	General Surgery
IM15.13	Observe cross matching and blood / blood component transfusion	S	SH	Y	Bedside clinic	Short note/ Viva voce/ Skill assessment		Pathology	General Surgery
IM15.14	Describe and enumerate the indications, pharmacology and side effects of pharmacotherapy of pressors used in the treatment of Upper GI bleed	K	K	Y	Lecture, Small group discussion	Short note/Viva voce		Pharmacology	General Surgery
IM15.15	Describe and enumerate the indications, pharmacology and side effects of pharmacotherapy of acid peptic disease including Helicobacter pylori	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Pharmacology, Microbiology	General Surgery
IM15.16	Enumerate the indications for endoscopic interventions and Surgery	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce			General Surgery
IM15.17	Determine appropriate level of specialist consultation	S	K	Y	Small group discussion				General Surgery
IM15.18	Counsel the family and patient in an empathetic non-judgmental manner on the diagnosis and therapeutic options	S	SH	Y	DOAP session	Skill assessment			General Surgery
Topic: Diarrheal disorder Number of competencies: (17) Number of procedures that require certification : (NIL)									
IM16.1	Describe and discuss the aetiology of acute and chronic diarrhea including infectious and non infectious causes	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Microbiology	
IM16.2	Describe and discuss the acute systemic consequences of diarrhea including its impact on fluid balance	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM16.3	Describe and discuss the chronic effects of diarrhea including malabsorption	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce			
IM16.4	Elicit and document and present an appropriate history that includes the natural history, dietary history, travel , sexual history and other concomitant illnesses	S	SH	Y	Bedside clinic, Skills lab	Skill assessment		Microbiology, Pathology	
IM16.5	Perform, document and demonstrate a physical examination based on the history that includes general examination, including an appropriate abdominal examination	S	SH	Y	Bedside clinic, Skills lab	Skill assessment			
IM16.6	Distinguish between diarrhea and dysentery based on clinical features	S	KH	Y	Lecture, Small group discussion	Short note/ Viva voce			
IM16.7	Generate a differential diagnosis based on the presenting symptoms and clinical features and prioritise based on the most likely diagnosis	S	SH	Y	Bedside clinic, Skills lab	Skill assessment/ short note/ Viva voce			
IM16.8	Choose and interpret diagnostic tests based on the clinical diagnosis including complete blood count, and stool examination	S	SH	Y	Bedside clinic, Skills lab, Small group discussion	Skill assessment/ Short note/ Viva voce		Microbiology, Pathology	
IM16.9	Identify common parasitic causes of diarrhea under the microscope in a stool specimen	S	SH	Y	DOAP session	Skill assessment		Microbiology	
IM16.10	Identify vibrio cholera in a hanging drop specimen	S	SH	Y	DOAP session	Skill Assessment		Microbiology	
IM16.11	Enumerate the indications for stool cultures and blood cultures in patients with acute diarrhea	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Microbiology	
IM16.12	Enumerate and discuss the indications for further investigations including antibodies, colonoscopy, diagnostic imaging and biopsy in the diagnosis of chronic diarrhea	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	General Surgery
IM16.13	Describe and enumerate the indications, pharmacology and side effects of pharmacotherapy for parasitic causes of diarrhea	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Pharmacology, Microbiology	
IM16.14	Describe and enumerate the indications, pharmacology and side effects of pharmacotherapy for bacterial and viral diarrhea	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Pharmacology, Microbiology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM16.15	Distinguish based on the clinical presentation Crohn's disease from Ulcerative Colitis	S	SH	Y	Lecture, Small group discussion	Short note/ Viva voce		Pathology	General Surgery
IM16.16	Describe and enumerate the indications, pharmacology and side effects of pharmacotherapy including immunotherapy	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce		Pharmacology	
IM16.17	Describe and enumerate the indications for surgery in inflammatory bowel disease	K	K	Y	Lecture, Small group discussion	Short note/ Viva voce			General Surgery
Topic: Headache Number of competencies: (14) Number of procedures that require certification : (NIL)									
IM17.1	Define and classify headache and describe the presenting features, precipitating factors, aggravating and relieving factors of various kinds of headache	K	KH	Y	Lecture, Small group discussion	Short note/ Viva voce		Human Anatomy	
IM17.2	Elicit and document and present an appropriate history including aura, precipitating aggravating and relieving factors, associated symptoms that help identify the cause of headaches	S	SH	Y	Bedside clinic, Small group discussion	Bedside clinic/ Skill assessment			
IM17.3	Classify migraine and describe the distinguishing features between classical and non classical forms of migraine	K	KH	Y	Bedside clinic, Small group discussion	Bedside clinic/ Skill assessment			
IM17.4	Perform and demonstrate a general neurologic examination and a focused examination for signs of intracranial tension including neck signs of meningitis	S	SH	Y	Bedside clinic, Small group discussion	Bedside clinic/ Skill assessment			
IM17.5	Generate document and present a differential diagnosis based on the clinical features, and prioritise the diagnosis based on the presentation	S	SH	Y	Bedside clinic, Small group discussion	Bedside clinic/ skill assessment			
IM17.6	Choose and interpret diagnostic testing based on the clinical diagnosis including imaging	S	SH	Y	Lecture, Small group discussion, Bedside clinic	Skill Assessment			
IM17.7	Enumerate the indications and describe the findings in the CSF in patients with meningitis	K	K	Y	Small group discussion, Bedside clinic	Skill Assessment		Microbiology, Pathology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM17.8	Demonstrate in a mannequin or equivalent the correct technique for performing a lumbar puncture	S	SH	Y	DOAP session	Skill assessment		Microbiology, Pathology	
IM17.9	Interpret the CSF findings when presented with various parameters of CSF fluid analysis	S	SH	Y	Small group discussion, Bedside clinic	Skill assessment		Microbiology, Pathology	
IM17.10	Enumerate the indications for emergency care admission and immediate supportive care in patients with headache	K	K	Y	Lecture, Small group discussion	Written/ Viva voce			
IM17.11	Describe the indications, pharmacology, dose, side effects of abortive therapy in migraine	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	
IM17.12	Describe the indications, pharmacology, dose, side effects of prophylactic therapy in migraine	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	
IM17.13	Describe the pharmacology, dose, adverse reactions and regimens of drugs used in the treatment of bacterial, tubercular and viral meningitis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	
IM17.14	Counsel patients with migraine and tension headache on lifestyle changes and need for prophylactic therapy	A/C	SH	N	DOAP session	Skill Assessment		Pharmacology	Psychiatry
Topic: Cerebrovascular accident Number of competencies: (17) Number of procedures that require certification : (NIL)									
IM18.1	Describe the functional and the vascular anatomy of the brain	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Human Anatomy	
IM18.2	Classify cerebrovascular accidents and describe the aetiology, predisposing genetic and risk factors pathogenesis of hemorrhagic and non hemorrhagic stroke	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology	
IM18.3	Elicit and document and present an appropriate history including onset, progression, precipitating and aggravating relieving factors, associated symptoms that help identify the cause of the cerebrovascular accident	S	SH	Y	Bedside clinic	Skill assessment		Pathology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM18.4	Identify the nature of the cerebrovascular accident based on the temporal evolution and resolution of the illness	K	KH	Y	Bedside clinic, Small group discussion	Skill Assessment			
IM18.5	Perform, demonstrate & document physical examination that includes general and a detailed neurologic examination as appropriate, based on the history	S	SH	Y	Bedside clinic, DOAP session	Skill Assessment			
IM18.6	Distinguish the lesion based on upper vs lower motor neuron, side, site and most probable nature of the lesion	K/S	SH	Y	Bedside clinic, DOAP session	Skill Assessment		Physiology	
IM18.7	Describe the clinical features and distinguish, based on clinical examination, the various disorders of speech	K/S	SH	N	Bedside clinic, DOAP session	Skill Assessment		Physiology	
IM18.8	Describe and distinguish, based on the clinical presentation, the types of bladder dysfunction seen in CNS disease	K	KH	Y	Small group discussion, Bedside clinic	Written/ Viva voce		Physiology	
IM18.9	Choose and interpret the appropriate diagnostic and imaging test that will delineate the anatomy and underlying cause of the lesion	S	KH	Y	Bedside clinic, DOAP session, Small group discussion	Written/ Viva voce/ Skill assessment		Radiodiagnosis	
IM18.10	Choose and interpret the appropriate diagnostic testing in young patients with a cerebrovascular accident (CVA)	S	SH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM18.11	Describe the initial supportive management of a patient presenting with a cerebrovascular accident (CVA)	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM18.12	Enumerate the indications for and describe acute therapy of non hemorrhagic stroke including the use of thrombolytic agents	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM18.13	Enumerate the indications for and describe the role of anti platelet agents in non hemorrhagic stroke	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM18.14	Describe the initial management of a hemorrhagic stroke	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM18.15	Enumerate the indications for surgery in a hemorrhagic stroke	K	K	Y	Lecture, Small group discussion	Written/ Viva voce			General Surgery

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM18.16	Enumerate the indications describe and observe the multidisciplinary rehabilitation of patients with a CVA	S	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Physical Medicine & Rehabilitation
IM18.17	Counsel patient and family about the diagnosis and therapy in an empathetic manner	A/C	SH	Y	DOAP session	Skill assessment			
Topic: Movement disorders Number of competencies: (09) Number of procedures that require certification : (NIL)									
IM19.1	Describe the functional anatomy of the locomotor system of the brain	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Human Anatomy, Physiology	
IM19.2	Classify movement disorders of the brain based on distribution, rhythm, repetition, exacerbating and relieving factors	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM19.3	Elicit and document and present an appropriate history including onset, progression precipitating and aggravating relieving factors, associated symptoms that help identify the cause of the movement disorders	S	SH	Y	Bedside clinic	Skill assessment			
IM19.4	Perform, demonstrate and document a physical examination that includes a general examination and a detailed neurologic examination using standard movement rating scales	S	SH	Y	Bedside clinic	Skill assessment			
IM19.5	Generate document and present a differential diagnosis and prioritise based on the history and physical examination	S	SH	Y	Bedside clinic	Skill assessment			
IM19.6	Make a clinical diagnosis regarding on the anatomical location, nature and cause of the lesion based on the clinical presentation and findings	S	SH	Y	Bedside clinic	Skill assessment			
IM19.7	Choose and interpret diagnostic and imaging tests in the diagnosis of movement disorders	S	SH	Y	Bedside clinic, Small group session	Skill assessment/ Written/ Viva voce		Radiodiagnosis	
IM19.8	Discuss and describe the pharmacology, dose, side effects and interactions used in the drug therapy of Parkinson's syndrome	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	
IM19.9	Enumerate the indications for use of surgery and botulinum toxin in the treatment of movement disorders	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	General Surgery

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
Topic: Envenomation		Number of competencies: (09)			Number of procedures that require certification : (NIL)				
IM20.1	Enumerate the local poisonous snakes and describe the distinguishing marks of each	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Forensic Medicine, Pharmacology	
IM20.2	Describe, demonstrate in a volunteer or a mannequin and educate (to other health care workers / patients) the correct initial management of patient with a snake bite in the field	S	SH	Y	DOAP session	Skill assessment/ Written/ Viva voce		Forensic Medicine	
IM20.3	Describe the initial approach to the stabilisation of the patient who presents with snake bite	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Forensic Medicine	
IM20.4	Elicit and document and present an appropriate history, the circumstance, time, kind of snake, evolution of symptoms in a patient with snake bite	S	SH	Y	Bedside clinic, DOAP session	Skill assessment		Forensic Medicine	
IM20.5	Perform a systematic examination, document and present a physical examination that includes general examination, local examination, appropriate cardiac and neurologic examination	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM20.6	Choose and interpret the appropriate diagnostic testing in patients with snake bites	S	SH	Y	Small group discussion	Written/ Viva voce			
IM20.7	Enumerate the indications and describe the pharmacology, dose, adverse reactions, hypersensitivity reactions of anti snake venom	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	
IM20.8	Describe the diagnosis, initial approach stabilisation and therapy of scorpion envenomation	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	
IM20.9	Describe the diagnosis initial approach stabilisation and therapy of bee sting allergy	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	
Topic: Poisoning		Number of competencies: (08)			Number of procedures that require certification : (NIL)				
IM21.1	Describe the initial approach to the stabilisation of the patient who presents with poisoning	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM21.2	Enumerate the common plant poisons seen in your area and describe their toxicology, clinical features, prognosis and specific approach to detoxification	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Forensic Medicine, Pharmacology	
IM21.3	Enumerate the common corrosives used in your area and describe their toxicology, clinical features, prognosis and approach to therapy	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Forensic Medicine, Pharmacology	
IM21.4	Enumerate the commonly observed drug overdose in your area and describe their toxicology, clinical features, prognosis and approach to therapy	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Forensic Medicine, Pharmacology	
IM21.5	Observe and describe the functions and role of a poison center in suspected poisoning	S	KH	Y	DOAP session	document in log book		Forensic Medicine, Pharmacology	
IM21.6	Describe the medico legal aspects of suspected suicidal or homicidal poisoning and demonstrate the correct procedure to write a medico legal report on a suspected poisoning	S	KH	Y	Lecture, Small group discussion, DOAP session	Written/ Viva voce/ Skill assessment		Forensic Medicine, Pharmacology	
IM21.7	Counsel family members of a patient with suspected poisoning about the clinical and medico legal aspects with empathy	A/C	SH	Y	DOAP session	Skill assessment		Forensic Medicine, Pharmacology	
IM21.8	Enumerate the indications for psychiatric consultation and describe the precautions to be taken in a patient with suspected suicidal ideation / gesture	K	KH	Y	DOAP session	Skill assessment		Forensic Medicine, Psychiatry	
Topic: Mineral, Fluid Electrolyte and Acid base Disorder Number of competencies: (13) Number of procedures that require certification : (NIL)									
IM22.1	Enumerate the causes of hypercalcemia and distinguish the features of PTH vs non PTH mediated hypercalcemia	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Pathology, Physiology	
IM22.2	Describe the aetiology, clinical manifestations, diagnosis and clinical approach to primary hyperparathyroidism	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Pathology	General Surgery
IM22.3	Describe the approach to the management of hypercalcemia	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	
IM22.4	Enumerate the components and describe the genetic basis of the multiple endocrine neoplasia syndrome	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Pathology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM22.5	Enumerate the causes and describe the clinical features and the correct approach to the diagnosis and management of the patient with hyponatremia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM22.6	Enumerate the causes and describe the clinical and laboratory features and the correct approach to the diagnosis and management of the patient with hyponatremia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM22.7	Enumerate the causes and describe the clinical and laboratory features and the correct approach to the diagnosis and management of the patient with hypokalemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM22.8	Enumerate the causes and describe the clinical and laboratory features and the correct approach to the diagnosis and management of the patient with hyperkalemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM22.9	Enumerate the causes and describe the clinical and laboratory features of metabolic acidosis	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Physiology	
IM22.10	Enumerate the causes of describe the clinical and laboratory features of metabolic alkalosis	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Physiology	
IM22.11	Enumerate the causes and describe the clinical and laboratory features of respiratory acidosis	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Physiology	
IM22.12	Enumerate the causes and describe the clinical and laboratory features of respiratory alkalosis	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Physiology	
IM22.13	Identify the underlying acid based disorder based on an ABG report and clinical situation	S	KH	N	Lecture, Small group discussion	Written/ Viva voce		Physiology	
Topic: Nutritional and Vitamin Deficiencies Number of competencies: (05) Number of procedures that require certification: (NIL)									
IM23.1	Discuss and describe the methods of nutritional assessment in an adult and calculation of caloric requirements during illnesses	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Physiology, Biochemistry	Pediatrics
IM23.2	Discuss and describe the causes and consequences of protein caloric malnutrition in the hospital	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Physiology, Biochemistry	Pediatrics

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM23.3	Discuss and describe the aetiology, causes, clinical manifestations, complications, diagnosis and management of common vitamin deficiencies	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Physiology, Biochemistry	Pediatrics
IM23.4	Enumerate the indications for enteral and parenteral nutrition in critically ill patients	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Physiology, Biochemistry	Pediatrics
IM23.5	Counsel and communicate to patients in a simulated environment with illness on an appropriate balanced diet	S	SH	Y	DOAP session	Skill assessment			
Topic: Geriatrics Number of competencies: (22) Number of procedures that require certification : (NIL)									
IM24.1	Describe and discuss the epidemiology, pathogenesis, clinical evolution, presentation and course of common diseases in the elderly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM24.2	Perform multidimensional geriatric assessment that includes medical, psycho-social and functional components	S	SH	Y	Bedside clinic, DOAP session	Skill assessment		Psychiatry	
IM24.3	Describe and discuss the aetiopathogenesis, clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of acute confusional states	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM24.4	Describe and discuss the aetiopathogenesis, clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of vascular events in the elderly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM24.5	Describe and discuss the aetiopathogenesis clinical presentation identification, functional changes, acute care, stabilization, management and rehabilitation of depression in the elderly	K	KH	Y	Lecture Small group discussion	Written/ Viva voce			Psychiatry
IM24.6	Describe and discuss the aetiopathogenesis causes, clinical presentation, difference in discussion presentation identification, functional changes, acute care, stabilization, management and rehabilitation of dementia in the elderly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			AETCOM

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM24.7	Describe and discuss the aetiopathogenesis,clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of personality changes in the elderly	K	KH	N	Lecture, Small group discussion	Written/ Viva voce			Psychiatry
IM24.8	Describe and discuss the aetiopathogenesis,clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of osteoporosis in the elderly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM24.9	Describe and discuss the aetiopathogenesis,clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of CVA in the elderly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM24.10	Describe and discuss the aetiopathogenesis,clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of COPD in the elderly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Respiratory Medicine
IM24.11	Describe and discuss the aetiopathogenesis,clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of the elderly undergoing surgery	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Anesthesiology, General Surgery
IM24.12	Describe and discuss the aetiopathogenesis,clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of degenerative joint disease	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Orthopedics
IM24.13	Describe and discuss the aetiopathogenesis,clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of falls in the elderly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Orthopedics, Physical Medicine & Rehabilitation
IM24.14	Describe and discuss the aetiopathogenesis,clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of common fractures in the elderly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Orthopedics
IM24.15	Describe and discuss the aetiopathogenesis,clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of vision and visual loss in the elderly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Ophthalmology

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM24.16	Describe and discuss the principles of physical and social rehabilitation, functional assessment, role of physiotherapy and occupational therapy in the management of disability in the elderly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Orthopedics, Physical Medicine & Rehabilitation
IM24.17	Describe and discuss the aetiopathogenesis, clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of hearing loss in the elderly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			ENT
IM24.18	Describe the impact of the demographic changes in ageing on the population	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Community Medicine	
IM24.19	Enumerate and describe the social problems in the elderly including isolation, abuse, change in family structure and their impact on health.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Psychiatry
IM24.20	Enumerate and describe social interventions in the care of elderly including domiciliary discussion services, rehabilitation facilities, old age homes and state interventions	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			
IM24.21	Enumerate and describe ethical issues in the care of the elderly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			AETCOM
IM24.22	Describe and discuss the aetiopathogenesis, clinical presentation, complications, assessment and management of nutritional disorders in the elderly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Physiology, Biochemistry	
Topic: Miscellaneous Infections		Number of competencies: (13)			Number of procedures that require certification : (NIL)				
IM25.1	Describe and discuss the response and the influence of host immune status, risk factors and comorbidities on zoonotic diseases (e.g. Leptospirosis, Rabies) and non-febrile infectious disease (e.g. Tetanus)	K	K	Y	Lecture, Small group discussion	Written		Microbiology, Community Medicine	
IM25.2	Discuss and describe the common causes, pathophysiology and manifestations of these diseases	K	K	Y	Lecture, Small group discussion	Written		Microbiology, Community Medicine	
IM25.3	Describe and discuss the pathophysiology and manifestations of these diseases	K	KH	Y	Lecture, Small group discussion	Written		Microbiology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM25.4	Elicit document and present a medical history that helps delineate the aetiology of these diseases that includes the evolution and pattern of symptoms, risk factors, exposure through occupation and travel	S	SH	Y	Bedside clinic, DOAP session	Skill assessment		Community Medicine	
IM25.5	Perform a systematic examination that establishes the diagnosis and severity of presentation that includes: general skin, mucosal and lymph node examination, chest and abdominal examination (including examination of the liver and spleen)	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM25.6	Generate a differential diagnosis and prioritise based on clinical features that help distinguish between infective, inflammatory, malignant and rheumatologic causes	K	SH	Y	Bedside clinic, DOAP session	Written/ Viva voce			
IM25.7	Order and interpret diagnostic tests based on the differential diagnosis including: CBC with differential, blood biochemistry, peripheral smear, urinary analysis with sediment, Chest X ray, blood and urine cultures, sputum gram stain and cultures, sputum AFB and cultures, CSF analysis, pleural and body fluid analysis, stool routine and culture and QBC	K	SH	Y	Bedside clinic, Skill assessment	Skill assessment		Pathology, Microbiology	
IM25.8	Enumerate the indications for use of newer techniques in the diagnosis of these infections	K	KH	N	Lecture, Small group discussion	Written/ Viva voce			
IM25.9	Assist in the collection of blood and other specimen cultures	S	SH	Y	DOAP session	Log book documentation		Microbiology	
IM25.10	Develop and present an appropriate diagnostic plan based on the clinical presentation, most likely diagnosis in a prioritised and cost effective manner	K	KH	Y	Bedside clinic, Skill assessment	Skill assessment			
IM25.11	Develop an appropriate empiric treatment plan based on the patient's clinical and immune status pending definitive diagnosis	C	SH	Y	DOAP session	Skill assessment		Microbiology, Pharmacology	
IM25.12	Communicate to the patient and family the diagnosis and treatment of identified infection	C	SH	Y	DOAP session	Skill assessment		AETCOM	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM25.13	Counsel the patient and family on prevention of various infections due to environmental issues	C	SH	Y	DOAP session	Skill assessment		Community Medicine, General Medicine	
Topic: The role of the physician in the community Number of competencies: (49) Number of procedures that require certification : (NIL)									
IM26.1	Enumerate and describe professional qualities and roles of a physician	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.2	Describe and discuss the commitment to lifelong learning as an important part of physician growth	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.3	Describe and discuss the role of non maleficence as a guiding principle in patient care	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.4	Describe and discuss the role of autonomy and shared responsibility as a guiding principle in patient care	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.5	Describe and discuss the role of beneficence of a guiding principle in patient care	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.6	Describe and discuss the role of a physician in health care system	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.7	Describe and discuss the role of justice as a guiding principle in patient care	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.8	Identify discuss medicolegal, socioeconomic and ethical issues as it pertains to organ donation	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.9	Identify, discuss and defend medicolegal, sociocultural, economic and ethical issues as it pertains to rights, equity and justice in access to health care	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.10	Identify, discuss and defend medicolegal, socio-cultural and ethical issues as it pertains to confidentiality in patient care	K	KH	Y	Small group discussion	Written/ Viva voce			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM26.11	Identify, discuss and defend medicolegal, socio-cultural and ethical issues as it pertains to patient autonomy, patient rights and shared responsibility in health care	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.12	Identify, discuss and defend medicolegal, socio-cultural and ethical issues as it pertains to decision making in health care including advanced directives and surrogate decision making	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.13	Identify, discuss and defend medicolegal, socio-cultural and ethical issues as it pertains to decision making in emergency care including situations where patients do not have the capability or capacity to give consent	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.14	Identify, discuss and defend medicolegal, socio-cultural and ethical issues as it pertains to research in human subjects	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.15	Identify, discuss and defend, medicolegal,socio-cultural and ethical issues as they pertain to consent for surgical procedures	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.16	Identify, discuss and defend medicolegal, socio-cultural, professional and ethical issues as it pertains to the physician patient relationship (including fiduciary duty)	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.17	Identify, discuss physician's role and responsibility to society and the community that she/ he serves	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.18	Identify, discuss and defend medicolegal, socio-cultural, professional and ethical issues in physician- industry relationships	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.19	Demonstrate ability to work in a team of peers and superiors	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM26.20	Demonstrate ability to communicate to patients in a patient, respectful, non threatening, non judgemental and empathetic manner	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM26.21	Demonstrate respect to patient privacy	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM26.22	Demonstrate ability to maintain confidentiality in patient care	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			
IM26.23	Demonstrate a commitment to continued learning	S	SH	Y	Small group discussion	Skill assessment/ Viva voce			
IM26.24	Demonstrate respect in relationship with patients, fellow team members, superiors and other health care workers	S	SH	Y	Bedside clinic, DOAP session	Skill assessment/ Viva voce			
IM26.25	Demonstrate responsibility and work ethics while working in the health care team	S	SH	Y	Bedside clinic, DOAP session	Skill assessment/ Viva voce			
IM26.26	Demonstrate ability to maintain required documentation in health care (including correct use of medical records)	S	SH	Y	Small group discussion	Skill assessment/ Viva voce			
IM26.27	Demonstrate personal grooming that is adequate and appropriate for health care responsibilities	S	SH	Y	Small group discussion	Skill assessment			
IM26.28	Demonstrate adequate knowledge and use of information technology that permits appropriate patient care and continued learning	S	SH	Y	Small group discussion	Skill assessment/ Viva voce			
IM26.29	Communicate diagnostic and therapeutic opitons to patient and family in a simulated environment	S	SH	Y	Bedside clinic, DOAP session	Skill assessment/ Viva voce			
IM26.30	Communicate care opitons to patient and family with a terminal illness in a simulated environment	S	SH	Y	Bedside clinic, DOAP session	Skill assessment/ Viva voce			
IM26.31	Demonstrate awareness of limitations and seeks help and consultations appropriately	S	SH	Y	Bedside clinic, DOAP session	Skill assessment/ Viva voce			
IM26.32	Demonstrate appropriate respect to colleagues in the profession	S	SH	N	Small group discussion	Skill assessment/ Viva voce			
IM26.33	Demonstrate an understanding of the implications and the appropriate procedures and response to be followed in the event of medical errors	S	SH	N	Small group discussion	Skill assessment/ Viva voce			
IM26.34	Identify conflicts of interest in patient care and professional relationships and describe the correct response to these conflicts	S	SH	Y	Small group discussion	Skill assessment/ Viva voce			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM26.35	Demonstrate empathy in patient encounters	S	SH	Y	Bedside clinic, DOAP session	Skill assessment/ Viva voce			
IM26.36	Demonstrate ability to balance personal and professional priorities	S	SH	N	Small group discussion	Skill assessment/ Viva voce			
IM26.37	Demonstrate ability to manage time appropriately	S	SH	Y	Small group discussion	Skill assessment/ Viva voce			
IM26.38	Demonstrate ability to form and function in appropriate professional networks	S	SH	N	Small group discussion	Skill assessment/ Viva voce			
IM26.39	Demonstrate ability to pursue and seek career advancement	S	SH	N	Small group discussion	Skill assessment/ Viva voce			
IM26.40	Demonstrate ability to follow risk management and medical error reduction practices where appropriate	S	SH	N	Small group discussion	Skill assessment/ Viva voce			
IM26.41	Demonstrate ability to work in a mentoring relationship with junior colleagues	S	SH	N	Small group discussion	Skill assessment/ Viva voce			
IM26.42	Demonstrate commitment to learning and scholarship	S	SH	N	Small group discussion	Skill assessment/ Viva voce			
IM26.43	Identify, discuss and defend medicolegal, sociocultural, economic and ethical issues as they pertain to in vitro fertilisation donor insemination and surrogate motherhood	K	KH	N	Small group discussion	Written/ Viva voce		Obstetrics & Gynaecology	
IM26.44	Identify, discuss and defend medicolegal, socio-cultural professional and ethical issues pertaining to medical negligence	K	KH	N	Small group discussion	Written/ Viva voce			
IM26.45	Identify, discuss and defend medicolegal, socio-cultural professional and ethical issues pertaining to malpractice	K	KH	N	Small group discussion	Written/ Viva voce			
IM26.46	Identify, discuss and defend medicolegal, socio-cultural professional and ethical issues in dealing with impaired physicians	K	KH	N	Small group discussion	Written/ Viva voce			

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
IM26.47	Identify, discuss and defend medicolegal, socio-cultural and ethical issues as they pertain to refusal of care including do not resuscitate and withdrawal of life support	K	KH	Y	Small group discussion	Written/ Viva voce			
IM26.48	Demonstrate altruism	S	SH	Y	Small group discussion	Written/ Viva voce			
IM26.49	Administer informed consent and appropriately adress patient queries to a patient being enrolled in a research protocol in a simulated environment	S	SH	Y	Bedside clinic, DOAP session	Written/ Viva voce			
	Column C: K- Knowledge, S – Skill, A - Attitude / professionalism, C- Communication. Column D: K – Knows, KH - Knows How, SH - Shows how, P- performs independently, Column F: DOAP session – Demonstrate, Observe, Assess, Perform. Column H: If entry is P: indicate how many procedures must be done independently for certification/ graduation								
Integration									
Human Anatomy									
AN5.6	Describe the concept of anastomoses and collateral circulation with significance of end-arteries	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	Physiology
AN7.5	Describe principles of sensory and motor innervation of muscles	K	KH	N	Lecture	Written		General Medicine	Physiology
AN7.6	Describe concept of loss of innervation of a muscle with its applied anatomy	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	
AN20.8	Identify & demonstrate palpation of femoral, popliteal, post tibial, anti tibial & dorsalis pedis blood vessels in a simulated environment	K/S	SH	Y	Practical, Lecture, Small group discussion, DOAP session	Viva voce/ Skill assessment		General Medicine	
AN20.9	Identify & demonstrate Palpation of vessels (femoral, popliteal,dorsalis pedis,post tibial), Mid inguinal point, Surface projection of: femoral nerve, Saphenous opening, Sciatic, tibial, common peroneal & deep peroneal nerve, great and small saphenous veins	K/S	SH	Y	Practical, Lecture, Small group discussion, DOAP session	Viva voce/ Skill assessment		General Medicine, General Surgery	
AN22.4	Describe anatomical basis of ischaemic heart disease	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	Physiology

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
AN22.7	Mention the parts, position and arterial supply of the conducting system of heart	K	KH	Y	Lecture	Written		General Medicine	Physiology
AN24.1	Mention the blood supply, lymphatic drainage and nerve supply of pleura, extent of pleura and describe the pleural recesses and their applied anatomy	K	KH	Y	Practical, Lecture	Written/ Viva voce		General Medicine	Physiology
AN24.2	Identify side, external features and relations of structures which form root of lung & bronchial tree and their clinical correlate	K/S	SH	Y	Practical, Lecture, Small group discussion, DOAP session	Written/ Viva voce/ Skill assessment		General Medicine	Physiology
AN24.3	Describe a bronchopulmonary segment	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	Physiology
AN25.3	Describe fetal circulation and changes occurring at birth	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	Physiology
AN25.4	Describe embryological basis of: 1) atrial septal defect, 2)ventricular septal defect, 3) Fallot's tetralogy & 4) tracheo-oesophageal fistula	K	KH	Y	Lecture	Written/ Viva voce		General Medicine, Pediatrics	Physiology
AN25.5	Describe developmental basis of congenital anomalies, transposition of great vessels, dextrocardia, patent ductus arteriosus and coarctation of aorta	K	KH	Y	Lecture	Written/ Viva voce		General Medicine, Pediatrics	Physiology
AN25.7	Identify structures seen on a plain x-ray chest (PA view)	K/S	SH	Y	Practical, DOAP session	Written/ Viva voce		Radiodiagnosis, General Medicine	
AN25.8	Identify and describe in brief a barium swallow	K/S	SH	N	Practical, DOAP session	Written/ Viva voce		Radiodiagnosis, General Medicine	
AN25.9	Demonstrate surface marking of lines of pleural reflection, Lung borders and fissures, Trachea, Heart borders, Apex beat & Surface projection of valves of heart	K/S	SH	Y	Practical	Viva voce/ Skill assessment		General Medicine, Pediatrics	Physiology
AN28.7	Explain the anatomical basis of facial nerve palsy	K	KH	Y	Lecture	Written		General Medicine	
AN50.3	Describe lumbar puncture (site, direction of the needle, structures pierced during the lumbar puncture)	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
AN56.1	Describe & identify various layers of meninges with its extent & modifications	K/S	SH	Y	Practical, Lecture, Small group discussion, DOAP session	Written/ Viva voce/ Skill assessment		General Medicine	
AN56.2	Describe circulation of CSF with its applied anatomy	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	Physiology
AN57.4	Enumerate ascending & descending tracts at mid thoracic level of spinal cord	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	Physiology
AN57.5	Describe anatomical basis of syringomyelia	K	KH	N	Lecture	Written		General Medicine	Physiology
AN58.4	Describe anatomical basis & effects of medial & lateral medullary syndrome	K	KH	N	Lecture	Written		General Medicine	Physiology
AN60.3	Describe anatomical basis of cerebellar dysfunction	K	KH	N	Lecture	Written		General Medicine	Physiology
AN61.3	Describe anatomical basis & effects of Benedict's and Weber's syndrome	K	KH	N	Lecture	Written		General Medicine	Physiology
AN62.2	Describe & demonstrate surfaces, sulci, gyri, poles, & functional areas of cerebral hemisphere	K/S	SH	Y	Practical, Lecture, Small group discussion, DOAP session	Written/ Viva voce/ Skill assessment		General Medicine	Physiology
AN62.3	Describe the white matter of cerebrum	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	Physiology
AN62.5	Describe boundaries, parts, gross relations, major nuclei and connections of dorsal thalamus, hypothalamus, epithalamus, metathalamus and subthalamus	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	Physiology
AN62.6	Describe & identify formation, branches & major areas of distribution of circle of Willis	K/S	SH	Y	Practical, Lecture, Small group discussion, DOAP session	Written/ Viva voce/ Skill assessment		General Medicine	Physiology
AN74.1	Describe the various modes of inheritance with examples	K	KH	Y	Lecture	Written		General Medicine, Pediatrics	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
AN74.2	Draw pedigree charts for the various types of inheritance & give examples of diseases of each mode of inheritance	K	KH	Y	Lecture	Written		General Medicine, Pediatrics	
AN74.3	Describe multifactorial inheritance with examples	K	KH	Y	Lecture	Written		General Medicine	
AN74.4	Describe the genetic basis & clinical features of Achondroplasia, Cystic Fibrosis, Vitamin D resistant rickets, Hemophilia, Duchene's muscular dystrophy & Sickle cell anaemia	K	KH	N	Lecture	Written		General Medicine, Pediatrics	
Physiology									
PY3.12	Explain the gradation of muscular activity	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PY3.13	Describe muscular dystrophy: myopathies	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Human Anatomy
PY4.9	Discuss the physiology aspects of: peptic ulcer, gastro- oesophageal reflux disease, vomiting, diarrhoea, constipation, Adynamic ileus, Hirschsprung's disease	S	SH	Y	Lecture, Small group discussion	Practical/ Viva voce		General Medicine	Biochemistry
PY5.5	Describe the physiology of electrocardiogram (E.C.G), its applications and the cardiac axis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PY5.6	Describe abnormal ECG, arrhythmias, heart block and myocardial Infarction	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Human Anatomy
PY5.10	Describe & discuss regional circulation including microcirculation, lymphatic circulation, coronary, cerebral, capillary, skin, foetal, pulmonary and splanchnic circulation	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PY5.13	Record and interpret normal ECG in a volunteer or simulated environment	S	SH	Y	DOAP sessions	Practical/OSPE/Viva voce		General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PY5.16	Record Arterial pulse tracing using finger plethysmography in a volunteer or simulated environment	S	SH	N	DOAP sessions, Computer assisted learning methods	Practical/OSPE/Viva voce		General Medicine	
PY7.7	Describe artificial kidney, dialysis and renal transplantation	K	KH	Y	Lecture, Small group discussion	Written/Viva voce		General Medicine	
PY11.14	Demonstrate Basic Life Support in a simulated environment	S	SH	Y	DOAP sessions	OSCE		General Medicine Anaesthesiology	
Biochemistry									
BI2.4	Describe and discuss enzyme inhibitors as poisons and drugs, therapeutic enzymes and the clinical utility of various serum enzymes as markers of pathological conditions	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, General Medicine	
BI2.5	Describe and discuss the clinical utility of various serum enzymes as markers of pathological conditions	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, General Medicine	
BI2.6	Discuss use of enzymes in laboratory investigations (Enzyme- based assays)	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, General Medicine	
BI2.7	Interpret laboratory results of enzyme activities & describe the clinical utility of various enzymes as markers of pathological conditions	K	KH	Y	Lecture, Small group discussion, DOAP sessions	Written/ Viva voce		Pathology, General Medicine	
BI3.4	Define and differentiate the pathways of carbohydrate metabolism (glycolysis, gluconeogenesis, glycogen metabolism, HMP shunt)	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI3.5	Describe and discuss the regulation, functions and integration of carbohydrate along with associated diseases/disorders	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI3.8	Discuss and interpret laboratory results of analytes associated with metabolism of carbohydrates	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, General Medicine	
BI3.9	Discuss the mechanism and significance of blood glucose regulation in health and disease	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
BI3.10	Interpret the results of blood glucose levels and other laboratory investigations related to disorders of carbohydrate metabolism	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI4.1	Describe and discuss main classes of lipids (Essential/non- essential fatty acids, cholesterol and hormonal steroids, triglycerides, major phospholipids and sphingolipids) relevant to human system and their major functions	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI4.2	Describe the processes involved in digestion and absorption of dietary lipids and also the key features of their metabolism	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI4.3	Explain the regulation of lipoprotein metabolism & associated disorders	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI4.4	Describe the structure and functions of lipoproteins, their functions, interrelations & relations with atherosclerosis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI4.5	Interpret laboratory results of analytes associated with metabolism of lipids	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI4.6	Describe the therapeutic uses of prostaglandins and inhibitors of eicosanoid synthesis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI4.7	Interpret laboratory results of analytes associated with metabolism of lipids	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI5.2	Describe and discuss functions of proteins and structure-function relationships in relevant areas e.g., hemoglobin and selected hemoglobinopathies	K	KH	Y	Lecture, Small group discussion	Viva voce/ Skill assessment		Pathology, General Medicine	Physiology
BI5.5	Interpret laboratory results of analytes associated with metabolism of proteins	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI6.1	Discuss the metabolic processes that take place in specific organs in the body in the fed and fasting states	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI6.4	Discuss the laboratory results of analytes associated with gout & Lesch Nyhan syndrome	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
BI6.5	Describe the biochemical role of vitamins in the body and explain the manifestations of their deficiency	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI6.7	Describe the processes involved in maintenance of normal pH, water & electrolyte balance of body fluids and the derangements associated with these	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Physiology
BI6.8	Discuss and interpret results of Arterial Blood Gas (ABG) analysis in various disorders	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI6.9	Describe the functions of various minerals in the body, their metabolism and homeostasis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Physiology
BI6.10	Enumerate and describe the disorders associated with mineral metabolism	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI6.11	Describe the functions of haem in the body and describe the processes involved in its metabolism and describe porphyrin metabolism	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, General Medicine	Physiology
BI6.12	Describe the major types of haemoglobin and its derivatives found in the body and their physiological/ pathological relevance	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, General Medicine	Physiology
BI6.13	Describe the functions of the kidney, liver, thyroid and adrenal glands	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, General Medicine	Physiology, Human Anatomy
BI6.14	Describe the tests that are commonly done in clinical practice to assess the functions of these organs (kidney, liver, thyroid and adrenal glands)	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, General Medicine	Physiology, Human Anatomy
BI6.15	Describe the abnormalities of kidney, liver, thyroid and adrenal glands.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pathology, General Medicine	Physiology, Human Anatomy
BI7.4	Describe applications of recombinant DNA technology, PCR in the diagnosis and treatment of diseases with genetic basis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pediatrics, General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
BI7.7	Describe the role of oxidative stress in the pathogenesis of conditions such as cancer, complications of diabetes mellitus and atherosclerosis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Pathology	
BI8.1	Discuss the importance of various dietary components and explain importance of dietary fibre	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Pediatrics, Pathology	
BI8.2	Describe the types and causes of protein energy malnutrition and its effects	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Pediatrics, Pathology	
BI8.3	Provide dietary advice for optimal health in childhood and adult, in disease conditions like diabetes mellitus, coronary artery disease and in pregnancy.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI8.4	Describe the causes (including dietary habits), effects and health risks associated with being overweight/ obesity	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Pathology	
BI8.5	Summarize the nutritional importance of commonly used items of food including fruits and vegetables (macro-molecules & its importance)	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Community Medicine, General Medicine, Pediatrics	
BI9.2	Discuss the involvement of ECM components in health and disease	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI10.4	Describe & discuss innate and adaptive immune responses, self/non-self recognition and the central role of T-helper cells in immune responses	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Pathology	Physiology
BI11.4	Perform urine analysis to estimate and determine normal and abnormal constituents	S	P	Y	Lecture, Small group discussion	Skill assessment	1	General Medicine	Physiology
BI11.5	Describe screening of urine for inborn errors & describe the use of paper chromatography	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
BI11.17	Explain the basis and rationale of biochemical tests done in the following conditions: - diabetes mellitus, - dyslipidemia, - myocardial infarction, - renal failure, gout, - proteinuria, - nephrotic syndrome, - edema, - jaundice, - liver diseases, pancreatitis, disorders of acid- base balance, thyroid disorders.	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine Pathology	
BI11.22	Calculate albumin: globulin (AG) ratio and creatinine clearance	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI11.23	Calculate energy content of different food Items, identify food items with high and low glycemic index and explain the importance of these in the diet	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
BI11.24	Enumerate advantages and/or disadvantages of use of unsaturated, saturated and trans fats in food.	K	KH	Y	Lecture, Small group discussion	Written/Viva voce		General Medicine	
BI1.26	Calculate albumin: globulin (AG) ratio and creatinine clearance	S	SH	Y	Lecture, Small group discussion	Skill assessment		General Medicine	
BI1.27	Calculate energy content of different food Items, identify food items with high and low glycemic index and explain the importance of these in the diet	S	SH	N	Lecture, Small group discussion	Skill assessment		General Medicine	
BI1.28	Enumerate advantages and/or disadvantages of use of unsaturated, saturated and trans fats in food	K	KH	Y	Lecture, Small group discussion	Written/Viva voce		General Medicine	
Pathology									
PA6.1	Define and describe edema its types pathogenesis and clinical correlations	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA9.4	Define autoimmunity. Enumerate autoimmune disorders	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PA9.5	Define and describe the pathogenesis of systemic lupus erythematosus	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA9.6	Define and describe the pathogenesis and pathology of HIV and AIDS	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Microbiology
PA9.7	Define and describe the pathogenesis of other common autoimmune diseases	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA10.1	Define and describe the pathogenesis and pathology of malaria	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Microbiology
PA10.2	Define and describe the pathogenesis and pathology of cysticercosis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Microbiology
PA10.3	Define and describe the pathogenesis and pathology of leprosy	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Microbiology
PA10.4	Define and describe the pathogenesis and pathology of common bacterial, viral, protozoal and helminthic diseases	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Microbiology
PA12.3	Describe the pathogenesis of obesity and its consequences	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA13.1	Describe hematopoiesis and extramedullary hematopoiesis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA13.2	Describe the role of anticoagulants in hematology	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA13.3	Define and classify anemia	K	KH	Y	Lecture, Small group	Written/ Viva voce		General Medicine	
PA13.4	Enumerate and describe the investigation of anemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA13.5	Perform, Identify and describe the peripheral blood picture in anemia	S	SH	Y	DOAP session	Skill assessment		General Medicine	
PA14.2	Describe the etiology, investigations and differential diagnosis of microcytic hypochromic anemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PA14.3	Identify and describe the peripheral smear in microcytic anemia	S	SH	Y	DOAP session	Skill assessment		General Medicine	
PA15.1	Describe the metabolism of Vitamin B12 and the etiology and pathogenesis of B12 deficiency	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Biochemistry, General Medicine	
PA15.2	Describe the laboratory investigations of macrocytic anemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA15.4	Enumerate the differences and describe the etiology and distinguishing features of megaloblastic and non-megaloblastic macrocytic anemia	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA16.1	Define and classify hemolytic anemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Biochemistry, General Medicine	
PA16.2	Describe the pathogenesis and clinical features and hematologic indices of hemolytic anemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Biochemistry, General Medicine	
PA16.3	Describe the pathogenesis, features, hematologic indices and peripheral blood picture of sickle cell anemia and thalassemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Biochemistry, General Medicine	
PA16.4	Describe the etiology pathogenesis, hematologic indices and peripheral blood picture of Acquired hemolytic anemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Biochemistry, General Medicine	
PA16.5	Describe indices and peripheral blood smear	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA 17.1	Enumerate the etiology, pathogenesis and findings in aplastic anemia	K	K	N	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA17.2	Enumerate the indications and describe the findings in bone marrow aspiration and biopsy	K	K	N	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA19.6	Enumerate and differentiate the causes of splenomegaly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Surgery, General Medicine	
PA21.3	Differentiate platelet from clotting disorders based on the clinical and hematologic features	S	SH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PA21.4	Define and describe disseminated intravascular coagulation, its laboratory findings and diagnosis of disseminated intravascular coagulation	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA21.5	Define and describe disseminated intravascular coagulation its laboratory findings and diagnosis of Vitamin K deficiency	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA22.4	Enumerate blood components and describe their clinical uses	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Surgery, General Medicine	
PA22.6	Describe transfusion reactions and enumerate the steps in the investigation of a transfusion reaction	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA24.2	Describe the etiology, pathogenesis, pathology, microbiology, clinical and microscopic features of peptic ulcer disease	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA24.3	Describe and identify the microscopic features of peptic ulcer	S	SH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA25.1	Describe bilirubin metabolism, enumerate the etiology and pathogenesis of jaundice, distinguish between direct and indirect hyperbilirubinemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Biochemistry, General Medicine	
PA25.2	Describe the pathophysiology and pathologic changes seen in hepatic failure and their clinical manifestations, complications and consequences	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, General Surgery	
PA25.3	Describe the etiology and pathogenesis of viral and toxic hepatitis: distinguish the causes of hepatitis based on the clinical and laboratory features. Describe the pathology, complications and consequences of hepatitis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA25.4	Describe the pathophysiology, pathology and progression of alcoholic liver disease including cirrhosis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, General Surgery	
PA25.5	Describe the etiology, pathogenesis and complications of portal hypertension	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, General Surgery	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PA25.6	Interpret a liver function and viral hepatitis serology panel. Distinguish obstructive from non obstructive jaundice based on clinical features and liver function tests	S	P	Y	DOAP session	Skill assessment	1	General Medicine	
PA26.1	Define and describe the etiology, types, pathogenesis, stages, morphology and complications of pneumonia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Microbiology
PA26.2	Describe the etiology, gross and microscopic appearance and complications of lung abscess	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Microbiology
PA26.3	Define and describe the etiology, types, pathogenesis, stages, morphology and complications and evaluation of Obstructive airway disease (OAD) and bronchiectasis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Physiology, General Medicine	Microbiology
PA26.4	Define and describe the etiology, types, pathogenesis, stages, morphology microscopic appearance and complications of tuberculosis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Microbiology
PA26.5	Define and describe the etiology, types, exposure, environmental influence, pathogenesis, stages, morphology, microscopic appearance and complications of Occupational lung disease	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Community Medicine	
PA26.6	Define and describe the etiology, types, exposure, genetics environmental influence, pathogenesis, stages, morphology, microscopic appearance,metastases and complications of tumors of the lung and pleura	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA26.7	Define and describe the etiology, types, exposure, genetics environmental influence, pathogenesis, morphology, microscopic appearance and complications of mesothelioma	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Community Medicine	
PA27.1	Distinguish arteriosclerosis from atherosclerosis. Describe the pathogenesis and pathology of various causes and types of arteriosclerosis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA27.2	Describe the etiology, dynamics, pathology types and complications of aneurysms including aortic aneurysms	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PA27.3	Describe the etiology, types, stages pathophysiology pathology and complications of heart failure	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Physiology	
PA27.4	Describe the etiology, pathophysiology, pathology, gross and microscopic, features, criteria and complications of rheumatic fever	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Microbiology
PA27.5	Describe the epidemiology, risk factors, etiology, pathophysiology, pathology, presentations, gross and microscopic, features, diagnostic tests and complications of ischemic heart disease	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA27.6	Describe the etiology, pathophysiology, pathology, gross and microscopic, features diagnosis and complications of infective endocarditis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Microbiology
PA27.7	Describe the etiology, pathophysiology, pathology, gross and microscopic, features diagnosis and complications of pericarditis and pericardial effusion	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA27.8	Interpret abnormalities in cardiac function testing in acute coronary syndromes	S	SH	Y	DOAP session	Skill Assessment		Physiology, General Medicine	
PA27.9	Classify and describe the etiology, types, pathophysiology, pathology, gross and microscopic features, diagnosis and complications of cardiomyopathies	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Physiology	
PA27.10	Describe the etiology, pathophysiology, pathology features and complications of syphilis on the cardiovascular system	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Microbiology
PA28.3	Define and describe the etiology, precipitating factors, pathogenesis, pathology, laboratory urinary findings, progression and complications of acute renal failure	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA28.4	Define and describe the etiology, precipitating factors, pathogenesis, pathology, laboratory urinary findings progression and complications of chronic renal failure	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PA28.5	Define and classify glomerular diseases. Enumerate and describe the etiology, pathogenesis, mechanisms of glomerular injury, pathology, distinguishing features and clinical manifestations of glomerulonephritis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Physiology, General Medicine	
PA28.6	Define and describe the etiology, pathogenesis, pathology, laboratory, urinary findings, progression and complications of IgA nephropathy	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA28.7	Enumerate and describe the findings in glomerular manifestations of systemic disease	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA28.8	Enumerate and classify diseases affecting the tubular interstitium	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA28.9	Define and describe the etiology, pathogenesis, pathology, laboratory, urinary findings, progression and complications of acute tubular necrosis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA28.11	Define classify and describe the etiology, pathogenesis pathology, laboratory, urinary findings, distinguishing features, progression and complications of vascular disease of the kidney	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA28.12	Define classify and describe the genetics, inheritance etiology, pathogenesis, pathology, laboratory, urinary findings, distinguishing features, progression and complications of cystic disease of the kidney	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Pediatrics	
PA28.15	Describe the etiology, genetics, pathogenesis, pathology, presenting features and progression of thrombotic angiopathies	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA31.4	Enumerate and describe the etiology, hormonal dependency and pathogenesis of gynecomastia	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Pediatrics, General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PA32.1	Enumerate, classify and describe the etiology, pathogenesis, pathology and iodine dependency of thyroid swellings	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Human Anatomy, Physiology, General Medicine, General Surgery	
PA32.2	Describe the etiology, cause, iodine dependency, pathogenesis, manifestations, laboratory and imaging features and course of thyrotoxicosis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Physiology, General Medicine	
PA32.3	Describe the etiology, pathogenesis, manifestations, laboratory and imaging features and course of thyrotoxicosis/ hypothyroidism	K	KH	Y	Lecture, Small group	Written/ Viva voce		Physiology, General Medicine	
PA32.4	Classify and describe the epidemiology, etiology, pathogenesis, pathology, clinical laboratory features, complications and progression of diabetes mellitus	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Physiology, General Medicine	
PA32.5	Describe the etiology, genetics, pathogenesis, manifestations, laboratory and morphologic features of hyperparathyroidism	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Physiology, General Medicine	
PA32.7	Describe the etiology, pathogenesis, manifestations, laboratory, morphologic features, complications of adrenal insufficiency	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Physiology, General Medicine	
PA32.8	Describe the etiology, pathogenesis, manifestations, laboratory, morphologic features, complications of Cushing's syndrome	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Physiology, General Medicine	
PA32.9	Describe the etiology, pathogenesis, manifestations, laboratory and morphologic features of adrenal neoplasms	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Human Anatomy, Physiology, General Medicine, General Surgery	
PA33.5	Classify and describe the etiology, immunology, pathogenesis, manifestations, radiologic and laboratory features, diagnostic criteria and complications of rheumatoid arthritis	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PA35.1	Describe the etiology, types and pathogenesis, differentiating factors, CSF findings in meningitis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Microbiology

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PA35.3	Identify the etiology of meningitis based on given CSF parameters	S	P	Y	DOAP session	Skill Assessment	1	General Medicine	Microbiology
Microbiology									
MI2.1	Describe the etiologic agents in rheumatic fever and their diagnosis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Pathology
MI2.2	Describe the classification, etio-pathogenesis, clinical features and discuss the diagnostic modalities of Infective endocarditis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Pathology
MI2.3	Identify the microbial agents causing Rheumatic heart disease & infective Endocarditis	S	SH	Y	DOAP session	Skill assessment		General Medicine	Pathology
MI2.4	List the common microbial agents causing anemia. Describe the morphology, mode of infection and discuss the pathogenesis, clinical course, diagnosis and prevention and treatment of the common microbial agents causing Anemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Pathology
MI2.5	Describe the etio-pathogenesis and discuss the clinical evolution and the laboratory diagnosis of kala-azar, malaria, filariasis and other common parasites prevalent in India	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Pathology
MI2.6	Identify the causative agent of malaria and filariasis	K/S	SH	Y	DOAP session	Skill assessment		General Medicine	
MI2.7	Describe the epidemiology, the etio- pathogenesis evolution complications, opportunistic infections, diagnosis prevention and the principles of management of HIV	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Pathology
MI3.1	Enumerate the microbial agents causing diarrhea and dysentery. Describe the epidemiology, morphology, pathogenesis, clinical features, and diagnostic modalities of these agents	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Paediatrics	Pathology
MI3.2	Identify the common etiologic agents of diarrhea and dysentery	S	SH	Y	DOAP session	Skill assessment		General Medicine, Paediatrics	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
MI3.3	Describe the enteric fever pathogens and discuss the evolution of the clinical course, the laboratory diagnosis of the diseases caused by them	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Pharmacology, Pathology
MI3.4	Identify the different modalities for diagnosis of enteric fever. Choose the appropriate test related to the duration of illness	S	KH	Y	DOAP session	Skill assessment		General Medicine	Pathology
MI3.5	Enumerate the causative agents of food poisoning and discuss the pathogenesis, clinical course and laboratory diagnosis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Pharmacology
MI3.6	Describe the etio-pathogenesis of Acid peptic disease (APD) and the clinical course. Discuss the diagnosis and management of the causative agent of APD	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Pharmacology, Pathology
MI3.7	Describe the epidemiology, the etio- pathogenesis and discuss the viral markers in the evolution of Viral hepatitis. Discuss the modalities in the diagnosis, and prevention of viral hepatitis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Pathology
MI3.8	Choose the appropriate laboratory test in the diagnosis of viral hepatitis	K	KH	Y	Small group discussion, Case discussion	Written/ Viva voce/ OSPE		General Medicine	Pathology
MI4.1	Enumerate the microbial agents causing anaerobic infections. Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of anaerobic infections	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	
MI5.1	Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of meningitis	K	KH	Y	Lecture	Written/ Viva voce		General Medicine, Paediatrics	Pathology
MI5.2	Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of encephalitis	K	KH	Y	Lecture	Written/ Viva voce		General Medicine, Paediatrics	Pathology
MI5.3	Identify the microbial agents causing meningitis	S	SH	Y	DOAP session	Skill assessment		General Medicine, Paediatrics	
MI6.1	Describe the etio-pathogenesis, laboratory diagnosis and prevention of Infections of upper and lower respiratory tract	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
MI6.2	Identify the common etiologic agents of upper respiratory tract infections (Gram Stain)	S	P	Y	DOAP session	Skill assessment	3	General Medicine	
MI6.3	Identify the common etiologic agents of lower respiratory tract infections (Gram Stain & Acid fast stain).	S	P	Y	DOAP session	Skill assessment	3	General Medicine	
MI7.3	Describe the etio-pathogenesis, clinical features, the appropriate method for specimen collection, and discuss the laboratory diagnosis of Urinary tract infections	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
MI8.1	Enumerate the microbial agents and their vectors causing Zoonotic diseases. Describe the morphology, mode of transmission, pathogenesis and discuss the clinical course, laboratory diagnosis and prevention	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
MI8.2	Describe the etio-pathogenesis of opportunistic infections (OI) and discuss the factors contributing to the occurrence of OI, and the laboratory diagnosis	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	Pathology
MI8.3	Describe the role of oncogenic viruses in the evolution of virus associated malignancy	K	KH	Y	Lecture	Written		General Medicine	Pathology
MI8.4	Describe the etiologic agents of emerging Infectious diseases. Discuss the clinical course and diagnosis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Community Medicine	
MI8.5	Define Healthcare Associated Infections (HAI) and enumerate it types. Discuss the factors that contribute to the development of HAI and the methods for prevention	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Community Medicine	
Pharmacology									
PH1.12	Calculate the dosage of drugs using appropriate formulae for an individual patient, including children, elderly and patient with renal dysfunction	K/S	SH	Y	Lecture, practical	Written/ Viva voce		Pediatrics, General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PH1.16	Describe mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act by modulating autacoids, including: Anti-histaminics, 5-HT modulating drugs, NSAIDs, Drugs for gout, Anti-rheumatic drugs, drugs for migraine	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	
PH1.21	Describe the symptoms and management of methanol and ethanol poisonings	K	KH	Y	Lecture, Small group discussion	Written/Viva voce		General Medicine	
PH1.25	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs acting on blood, like anticoagulants, antiplatelets, fibrinolytics, plasma expanders	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Physiology, General Medicine	
PH1.26	Describe mechanisms of action, types, doses, side effects, indications and contraindications of the drugs modulating the renin angiotensin and aldosterone system	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Physiology, General Medicine	
PH1.27	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of Antihypertensive drugs and drugs used in shock	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PH1.28	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in ischemic heart disease (stable, unstable angina and myocardial infarction), peripheral vascular disease	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Pathology
PH1.29	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in congestive heart failure	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	Pathology
PH1.30	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used as Antiarrhythmics	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PH1.31	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in the management of dyslipidemia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PH1.34	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs used as below: 1. Acid-peptic disease and GERD 2. Antiemetics and prokinetics 3. Antidiarrhoeals 4. Laxatives 5. Inflammatory Bowel Disease 6. Irritable Bowel Disorders, biliary and pancreatic diseases	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
PH1.35	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in hematological disorders like: 1. Drugs used in anemias 2. Colony Stimulating factors	K	KH	Y	Lecture	Written/ Viva voce		General Medicine, Physiology	Pharmacology
PH1.36	Describe the mechanism of action, types, doses, side effects, indications and contraindications of drugs used in endocrine disorders (diabetes mellitus, thyroid disorders and osteoporosis)	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	Pathology, Pharmacology
PH1.43	Describe and discuss the rational use of antimicrobials including antibiotic stewardship program	K	KH	Y	Lecture	Written/ Viva voce		General Medicine Pediatrics	Microbiology, Pharmacology
PH1.47	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in malaria, KALA AZAR, amebiasis and intestinal helminthiasis	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	Microbiology
PH1.52	Describe management of common poisoning, insecticides, common sting and bites	K	KH	Y	Lecture	Written/ Viva voce		General Medicine	
PH2.4	Demonstrate the correct method of calculation of drug dosage in patients including those used in special situations	S	SH	Y	DOAP sessions	Skills assessment		Pediatrics, Pharmacology	
PH3.1	Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient	S/C	P	Y	Skill station	Skill station	5	General Medicine	
PH3.3	Perform a critical evaluation of the drug promotional literature	S	P	Y	Skill Lab	Maintenance of log book/ Skill station	3	General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PH3.5	To prepare and explain a list of P-drugs for a given case/condition	S	P	Y	Skill station	Maintenance of log book	3	General Medicine	
PH5.1	Communicate with the patient with empathy and ethics on all aspects of drug use	A/C	SH	Y	Small group discussion	Skill station		General Medicine	
PH5.4	Explain to the patient the relationship between cost of treatment and patient compliance	A/C	SH	Y	Small group discussion	Short note/ Viva voce		General Medicine	
Community Medicine									
CM3.1	Describe the health hazards of air, water, noise, radiation and pollution	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, ENT	
CM3.3	Describe the aetiology and basis of water borne diseases/jaundice/hepatitis/diarrheal diseases	K	KH	Y	Lecture, Small group discussion, DOAP session	Written/ Viva voce		Microbiology, General Medicine, Pediatrics	
CM5.1	Describe the common sources of various nutrients and special nutritional requirements according to age, sex, activity, physiological conditions	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Pediatrics	
CM5.2	Describe and demonstrate the correct method of performing a nutritional assessment of individuals, families and the community by using the appropriate method	S	SH	Y	DOAP sessions	Skill Assessment		General Medicine, Pediatrics	
CM5.3	Define and describe common nutrition related health disorders (including macro-PEM, Micro-iron, Zn, iodine, Vit. A), their control and management	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine, Pediatrics	
CM5.4	Plan and recommend a suitable diet for the individuals and families based on local availability of foods and economic status, etc in a simulated environment	S	SH	Y	DOAP sessions	Skill Assessment		General Medicine, Pediatrics	
CM5.5	Describe the methods of nutritional surveillance, principles of nutritional education and rehabilitation in the context of socio-cultural factors	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Medicine, Pediatrics	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
CM6.1	Formulate a research question for a study	K	KH	Y	Small group discussion, Lecture, DOAP sessions	Written/ Viva voce/ Skill Assessment		General Medicine, Pediatrics	
CM6.2	Describe and discuss the principles and demonstrate the methods of collection, classification, analysis, interpretation and presentation of statistical data	S	SH	Y	Small group discussion, Lecture, DOAP sessions	Written/ Viva voce/ Skill Assessment		General Medicine, Pediatrics	
CM6.3	Describe, discuss and demonstrate the application of elementary statistical methods including test of significance in various study designs	S	SH	Y	Small group discussion, Lecture, DOAP sessions	Written/ Viva voce/ Skill Assessment		General Medicine, Pediatrics	
CM6.4	Enumerate, discuss and demonstrate common sampling techniques, simple statistical methods, frequency distribution, measures of central tendency and dispersion	S	SH	Y	Small group discussion, Lecture, DOAP sessions	Written/ Viva voce/ Skill Assessment		General Medicine, Pediatrics	
CM7.1	Define Epidemiology and describe and enumerate the principles, concepts and uses	K	KH	Y	Small group discussion, Lecture	Written/ Viva voce		General Medicine	
CM7.2	Enumerate, describe and discuss the modes of transmission and measures for prevention and control of communicable and non-communicable diseases	K	KH	Y	Small group discussion, Lecture	Written/ Viva voce		General Medicine	
CM7.3	Enumerate, describe and discuss the sources of epidemiological data	K	KH	Y	Small group discussion, Lecture	Written/ Viva voce		General Medicine	
CM7.4	Define, calculate and interpret morbidity and mortality indicators based on given set of data	S	SH	Y	Small group discussion, DOAP sessions	Written/ Skill assessment		General Medicine	
CM7.5	Enumerate, define, describe and discuss epidemiological study designs.	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		General Medicine	
CM7.6	Enumerate and evaluate the need of screening tests	S	SH	Y	Small group discussion, DOAP sessions	Written/ Skill assessment		General Medicine	
CM7.7	Describe and demonstrate the steps in the Investigation of an epidemic of communicable disease and describe the principles of control measures.	S	SH	Y	Small group discussion, DOAP sessions	Written/ Skill assessment		General Medicine	Microbiology

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
CM7.8	Describe the principles of association, causation and biases in epidemiological studies	K	KH	Y	Small group discussion, Lecture	Written/ Viva voce		General Medicine	
CM8.1	Describe and discuss the epidemiological and control measures including the use of essential laboratory tests at the primary care level for communicable diseases	K	KH	Y	Small group discussion, Lecture	Written/ Viva voce		General Medicine, Pediatrics	Microbiology Pathology
CM8.2	Describe and discuss the epidemiological and control measures including the use of essential laboratory tests at the primary care level for Non Communicable diseases (diabetes, Hypertension, Stroke, obesity and cancer etc.)	K	KH	Y	Small group discussion, Lecture	Written/ Viva voce		General Medicine	
CM8.3	Enumerate and describe disease-specific National Health Programs including their prevention and treatment of a case	K	KH	Y	Small group discussion, Lecture	Written/ Viva voce		General Medicine, Pediatrics	
CM8.4	Describe the principles and enumerate the measures to control a disease epidemic	K	KH	Y	Small group discussion, Lecture	Written/ Viva voce		General Medicine, Pediatrics	
CM8.5	Describe and discuss the principles of planning, implementing and evaluating control measures for disease at community level bearing in mind the public health importance of the disease	K	KH	Y	Small group discussion, Lecture	Written / Viva voce		General Medicine, Pediatrics	
CM12.1	Define and describe the concept of Geriatric services	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
CM12.2	Describe health problems of aged population	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
CM12.3	Describe the prevention of health problems of aged population	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
CM12.4	Describe National program for elderly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
CM13.1	Define and describe the concept of Disaster management	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Surgery, General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
CM13.2	Describe disaster management cycle	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Surgery, General Medicine	
CM13.3	Describe man made disasters in the world and in India	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Surgery, General Medicine	
CM13.4	Describe the details of the National Disaster management Authority	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Surgery, General Medicine	
Forensic Medicine & Toxicology									
FM1.9	Describe the importance of documentation in medical practice in regard to medicolegal examinations, Medical Certificates and medicolegal reports especially – maintenance of patient case records, discharge summary, prescribed registers to be maintained in Health Centres. -- maintenance of medico-legal register like accident register. - documents of issuance of wound certificate - documents of issuance of drunkenness certificate. - documents of issuance of sickness and fitness certificate. - documents for issuance of death certificate. - documents of Medical Certification of Cause of Death - Form Number4 and 4A - documents for estimation of age by physical, dental and radiological examination and issuance of certificate	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Radiodiagnosis, General Surgery, General Medicine, Pediatrics	
FM2.34	Demonstrate ability to use local resources whenever required like in mass disaster situations	A & C	KH	Y	Lecture, Small group discussion	Written/Viva voce		General Medicine, AETCOM	
FM3.22	Define and discuss impotence, sterility, frigidity, sexual dysfunction, premature ejaculation. Discuss the causes of impotence and sterility in male and female	K	K/KH	Y	Lecture, Small group discussion	Written/ Viva voce		Obstetrics & Gynaecology, General Medicine	
FM5.5	Describe & discuss Delirium tremens	K	K/KH	Y	Lecture, Small group discussion	Written/Viva voce		Psychiatry, General Medicine	
FM8.6	Describe the general symptoms, principles of diagnosis and management of common poisons encountered in India.	K	K/KH	Y	Lecture, Small group discussion, Bed side clinic, DOAP session	Written/Viva voce/OSCE		Pharmacology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH /SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
FM8.7	Describe simple Bedside clinic tests to detect poison/drug in a patient's body fluids	K	K/KH	Y	Lecture, Small group discussion, Bed side clinic, DOAP session	Written/Viva voce/OSCE		Pharmacology, General Medicine	
FM8.8	Describe basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination	K	K/KH	Y	Lecture, Small group discussion, Bed side clinic, DOAP session	Written/ Viva voce/ OSCE		Pharmacology, General Medicine	
FM9.1	Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to: Caustics Inorganic – sulphuric, nitric, and hydrochloric acids Organic- Carbolic Acid (phenol), Oxalic and acetylsalicylic acids .	K	K/KH	Y	Lecture, Small group discussion, Bed side clinic, Autopsy, DOAP session	Written/ Viva voce/ OSCE		Pharmacology, General Medicine	
FM9.2	Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Phosphorus, Iodine, Barium	K	K/KH	Y	Lecture, Small group discussion, Bed side clinic, Autopsy, DOAP session	Written/ Viva voce/ OSCE		Pharmacology, General Medicine	
FM9.3	Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Arsenic, lead, mercury, copper, iron, cadmium and thallium	K	K/KH	Y	Lecture, Small group discussion, Bed side clinic, Autopsy, DOAP session	Written/ Viva voce/ OSCE		Pharmacology, General Medicine	
FM9.4	Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Ethanol, methanol, ethylene glycol	K	K/KH	Y	Lecture, Small group discussion, Bed side clinic, Autopsy, DOAP session	Written/ Viva voce/ OSCE		Pharmacology, General Medicine	
FM9.5	Describe General Principles and basic methodologies in treatment of poisoning: decontamination, supportive therapy, antidote therapy, procedures of enhanced elimination with regard to Organophosphates, Carbamates, Organochlorines, Pyrethroids, Paraquat, Aluminium and Zinc phosphide	K	K/KH	Y	Lecture, Small group discussion, Bed side clinic, Autopsy, DOAP session	Written/ Viva voce/ OSCE		Pharmacology, General Medicine	

[illegible]

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
DR9.1	Classify, describe the epidemiology, etiology, microbiology pathogenesis and clinical presentations and diagnostic features of Leprosy	K	KH	Y	Lecture, Small group discussion	Written /Viva voce		General Medicine	Microbiology, Community Medicine
DR9.2	Demonstrate (and classify based on) the clinical features of leprosy including an appropriate neurologic examination	S	SH	Y	Lecture, Small group discussion	Bedside clinic session/ Skill assessment		General Medicine	
DR9.4	Enumerate, describe and identify lepra reactions and supportive measures and therapy of lepra reactions	K	KH	Y	Lecture, Small group discussion	Written /Viva voce		General Medicine	Pharmacology
DR9.5	Enumerate the indications and describe the pharmacology, administration and adverse reaction of pharmacotherapies for various classes of leprosy based on national guidelines	K	KH	Y	Lecture, Small group discussion	Written /Viva voce		General Medicine	Pharmacology, Community Medicine
DR9.6	Describe the treatment of Leprosy based on the WHO guidelines	K	KH	Y	Lecture, Small group discussion	Written /Viva voce		General Medicine	Pharmacology, Community Medicine
DR9.7	Enumerate and describe the complications of leprosy and its management, including understanding disability and stigma.	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Medicine	Pharmacology, Psychiatry
DR10.1	Identify and classify syphilis based on the presentation and clinical manifestations	S	SH	Y	Bedside clinic	Skill assessment		General Medicine	Microbiology
DR10.3	Enumerate the indications and describe the pharmacology, administration and adverse reaction of pharmacotherapies for syphilis	K	KH	Y	Lecture, Small group discussion	Written /Viva voce		General Medicine	Pharmacology, Microbiology
DR10.4	Describe the prevention of congenital syphilis	K	KH	Y	Lecture, Small group discussion	Written /Viva voce		General Medicine	
DR10.5	Counsel in a non-judgemental and empathetic manner patients on prevention of sexually transmitted diseases	C	SH	Y	Lecture, Small group discussion	Skill assessment		General Medicine	
DR10.6	Describe the etiology, diagnostic and clinical features of non- syphilitic sexually transmitted diseases (chancroid, donovanosis and LGV)	K	KH	Y	Lecture, Small group discussion	Written /Viva voce		General Medicine	Microbiology

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
DR10.7	Identify and differentiate based on the clinical features non-syphilitic sexually transmitted diseases (chancroid, donovanosis and LGV)	S	SH	Y	Lecture, Small group discussion	Skill assessment		General Medicine	Microbiology
DR10.8	Enumerate the indications and describe the pharmacology, indications and adverse reactions of drugs used in the non-syphilitic sexually transmitted diseases (chancroid, donovanosis and LGV)	K	KH	Y	Lecture, Small group discussion	Written /Viva voce		General Medicine	Pharmacology, Microbiology
DR10.9	Describe the syndromic approach to ulcerative sexually transmitted disease	K	KH	Y	Lecture, Small group discussion	Written /Viva voce		General Medicine	
DR10.10	Describe the etiology, diagnostic and clinical features and management of gonococcal and non gonococcal urethritis	K	KH	Y	Lecture, Small group discussion	Written /Viva voce		General Medicine	
DR11.1	Describe the etiology, pathogenesis and clinical features of the dermatologic manifestations of HIV and its complications including opportunistic infections	K	KH	Y	Lecture, Small group discussion	Written /Viva voce		General Medicine	Microbiology
DR11.2	Identify and distinguish the dermatologic manifestations of HIV its complications, opportunistic infections and adverse reactions	S	SH	Y	Lecture, Small group discussion	Skill assessment		General Medicine	Microbiology
DR11.3	Enumerate the indications and describe the pharmacology, administration and adverse reaction of pharmacotherapies for dermatologic lesions in HIV	K	KH	Y	Lecture, Small group discussion	Written / Viva voce		General Medicine	Pharmacology, Microbiology
DR12.7	Identify and distinguish fixed drug eruptions and Steven Johnson syndrome from other skin lesions	S	SH	Y	Lecture, Small group discussion	Skill assessment		General Medicine	Pathology, Microbiology
DR16.1	Identify and distinguish skin lesions of SLE	S	SH	Y	Lecture, Small group discussion	Skill assessment		General Medicine	Pathology
DR16.2	Identify and distinguish Raynaud's phenomenon	S	SH	Y	Lecture, Small group discussion	Skill assessment		General Medicine	Pathology
DR17.1	Enumerate and identify the cutaneous findings in vitamin A deficiency	K/S	SH	Y	Lecture, Small group discussion	Skill assessment/ Viva voce		General Medicine, Pediatrics, Biochemistry	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
DR17.2	Enumerate and describe the various skin changes in Vitamin B complex deficiency	K	KH	Y	Lecture, Small group discussion	Written/Viva voce		General Medicine, Pediatrics, Biochemistry	
DR17.3	Enumerate and describe the various changes in Vitamin C deficiency	K	KH	Y	Lecture, Small group discussion	Written/Viva voce		General Medicine, Pediatrics, Biochemistry	
DR17.4	Enumerate and describe the various changes in Zinc deficiency	K	KH	Y	Lecture, Small group discussion	Written/Viva voce		General Medicine, Pediatrics, Biochemistry	
DR18.1	Enumerate the cutaneous features of Type 2 diabetes	K	K	Y	Lecture, Small group discussion	Written/Viva voce		General Medicine	
DR18.2	Enumerate the cutaneous features of hypo- & hyperthyroidism	K	K	Y	Lecture, Small group discussion	Written/Viva voce		General Medicine	
Anesthesiology									
AS2.1	Enumerate the indications, describe the steps and demonstrate in a simulated environment basic life support in adults children and neonates	S	SH	N	DOAP session	Skill assessment		General Medicine, Pediatrics	
AS2.2	Enumerate the indications, describe the steps and demonstrate in a simulated environment advanced life support in adults and children	S	SH	N	DOAP session	Skill assessment		General Medicine	
AS3.1	Describe the principles of preoperative evaluation	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Surgery, General Medicine
AS3.2	Elicit, present and document an appropriate history including medication history in a patient undergoing Surgery as it pertains to a preoperative anaesthetic evaluation	S	SH	Y	DOAP session, Bedside clinic	Skill station			General Surgery, General Medicine
AS3.3	Demonstrate and document an appropriate clinical examination in a patient undergoing General Surgery	S	SH	Y	DOAP session, Bedside clinic	Skill station			General Surgery, General Medicine

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
AS3.4	Choose and interpret appropriate testing for patients undergoing Surgery	S	SH	Y	DOAP session, Bedside clinic	Skill station			General Surgery, General Medicine
AS3.5	Determine the readiness for General Surgery in a patient based on the preoperative evaluation	S	SH	Y	DOAP session, Bedside clinic	Skill station			General Surgery, General Medicine
AS7.2	Enumerate and describe the criteria for admission and discharge of a patient to an ICU	S	KH	Y	Lecture, Small group discussion, DOAP session	Written/ Viva voce			General Medicine
AS7.3	Observe and describe the management of an unconscious patient	S	KH	Y	Lecture, Small group discussion DOAP session	Written/ Viva voce		Physiology	General Medicine
AS7.4	Observe and describe the basic setup process of a ventilator	S	KH	Y	Lecture, Small group discussion DOAP session	Written/ Viva voce		Physiology	General Medicine
AS7.5	Observe and describe the principles of monitoring in an ICU	S	KH	Y	Lecture, Small group discussion DOAP session	Written/ Viva voce			General Medicine
AS8.4	Describe the principles of pain management in palliative care	K	KH	Y	Lecture, Small group discussion, DOAP session	Written/ Viva voce		Pharmacology	General Medicine
AS8.5	Describe the principles of pain management in the terminally ill	K	KH	Y	Lecture, Small group discussion, DOAP session	Written/ Viva voce		Pharmacology	General Medicine
AS10.4	Define and describe common medical and medication errors in anaesthesia	K	KH	Y	Lecture, Small group discussion, DOAP session	Written/ Viva voce		Pharmacology	General Medicine
Otorhinolaryngology (ENT)									
EN4.53	Describe the Clinical features, Investigations and principles of management of HIV manifestations of the ENT	K	KH	N	Lecture, Small group discussion, Demonstration	Written/ Viva voce/ Skill assessment		General Medicine	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
Ophthalmology									
OP5.2	Define, enumerate and describe the aetiology, associated systemic conditions, clinical features, complications, indications for referral and management of scleritis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
OP6.3	Enumerate systemic conditions that can present as iridocyclitis and describe their ocular manifestations	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
OP9.3	Describe the role of refractive error correction in a patient with headache and enumerate the indications for referral	K	K	Y	Lecture, Small group discussion	Written/ Viva voce		General Medicine	
Dentistry									
DE1.4	Discuss the role of dental caries as a focus of sepsis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Microbiology, General Medicine	
Psychiatry									
PS3.7	Enumerate and describe common organic psychiatric disorders, magnitude, etiology and clinical features	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine
PS3.8	Enumerate and describe the essential investigations in patients with organic psychiatric disorders	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine
PS4.1	Describe the magnitude and etiology of alcohol and substance use disorders	K	KH	Y	Lecture, Small group discussion	Lecture/ Small group discussion			General Medicine
PS4.2	Elicit, describe and document clinical features of alcohol and substance use disorders	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			General Medicine
PS4.3	Enumerate and describe the indications and interpret laboratory and other tests used in alcohol and substance abuse disorders	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			General Medicine
PS4.4	Describe the treatment of alcohol and substance abuse disorders including behavioural and pharmacologic therapy	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	General Medicine

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PS4.6	Enumerate and describe the pharmacologic basis and side effects of drugs used in alcohol and substance abuse	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	General Medicine
PS10.1	Enumerate and describe the magnitude and etiology of somatoform, dissociative and conversion disorders	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine
PS10.2	Enumerate, elicit, describe and document clinical features in patients with somatoform, dissociative and conversion disorders	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			General Medicine
PS10.3	Enumerate and describe the indications and interpret laboratory and other tests used in somatoform, dissociative and conversion disorders	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			General Medicine
PS10.4	Describe the treatment of somatoform disorders including behavioural, psychosocial and pharmacologic therapy	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	General Medicine
PS10.6	Enumerate and describe the pharmacologic basis and side effects of drugs used in somatoform, dissociative and conversion disorders	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	General Medicine
PS12.1	Enumerate and describe the magnitude and etiology of psychosomatic disorders	K	KH	Y	Lecture Small group discussion	Written/ Viva voce			General Medicine
PS12.2	Enumerate, elicit, describe and document clinical features in patients with magnitude and etiology of psychosomatic disorders	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			General Medicine
PS12.3	Enumerate and describe the indications and interpret laboratory and other tests of psychosomatic disorders	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			General Medicine
PS12.4	Describe the treatment of psychosomatic disorders including behavioural psychosocial and pharmacologic therapy	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	General Medicine
PS16.1	Enumerate and describe common psychiatric disorders in the elderly including dementia, depression and psychosis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine
PS16.2	Describe the aetiology and magnitude of psychiatric illness in the elderly	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine
PS16.3	Describe the therapy of psychiatric illness in elderly including psychosocial and behavioural therapy	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PS16.4	Demonstrate family education in a patient with psychiatric disorders occurring in the elderly in a simulated environment	S	SH	Y	Bedside clinic, DOAP session	Skill assessment			General Medicine
Obstetrics & Gynaecology									
OG12.1	Define, classify and describe the etiology and pathophysiology, early detection, investigations; principles of management of hypertensive disorders of pregnancy and eclampsia, complications of eclampsia	K	KH	Y	Lecture, Small group discussion, Bedside clinics	Written/ Viva voce/ Skill assessment			General Medicine
OG12.2	Define, Classify and describe the etiology, pathophysiology, diagnosis, investigations, adverse effects on the mother and foetus and the management during pregnancy and labor, and complications of anemia in pregnancy	K	KH	Y	Lecture, Small group discussion, Bedside clinics	Written/ Viva voce/ Skill assessment			General Medicine
OG12.3	Define, Classify and describe the etiology, pathophysiology, diagnosis, investigations, criteria, adverse effects on the mother and foetus and the management during pregnancy and labor, and complications of diabetes in pregnancy	K	KH	Y	Lecture,Small group discussion, Bedside clinics	Written/ Viva voce/ Skill assessment			General Medicine
OG12.4	Define, classify and describe the etiology, pathophysiology, diagnosis, investigations, criteria, adverse effects on the mother and foetus and the management during pregnancy and labor, and complications of heart diseases in pregnancy	K	KH	Y	Lecture, Small group discussion, Bedside clinics	Written/ Viva voce/ Skill assessment			General Medicine
OG12.5	Describe the clinical features, detection, effect of pregnancy on the disease and impact of the disease on pregnancy complications and management in pregnancy of urinary tract infections	K	KH	Y	Lecture, Small group discussion, Bedside clinics	Written/ Viva voce/ Skill assessment			General Medicine
.	disease and impact of the disease on pregnancy complications and management in pregnancy of liver disease				discussion, Bedside clinics	assessment			
OG12.7	Describe and discuss Screening, risk factors, management of mother and newborn with HIV	K	KH	Y	Lecture, Small group discussion, Bedside clinics	Written/ Viva voce/ Skill assessment			General Medicine
Pediatrics									

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PE14.3	Discuss the risk factors, clinical features, diagnosis and management of Organophosphorous poisoning	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	General Medicine
PE32.3	Interpret normal Karyotype and recognize Trisomy 21	S	SH	Y	Bedside clinics, Skills lab	Log book			General Medicine
PE32.9	Discuss the referral criteria and multidisciplinary approach to management of Turner Syndrome	K	KH	N	Lecture, Small group discussion	Written/ Viva voce			General Medicine, Obstetrics & Gynecology
General Surgery									
SU22.6	Describe and discuss the clinical features of hypo- & hyperparathyroidism and the principles of their management	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine
SU23.2	Describe the etiology, clinical features and principles of management of disorders of adrenal gland	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine
Orthopaedics									
OR5.1	Describe and discuss the aetiopathogenesis, clinical features, Investigations and principles of management of various inflammatory disorder of joints	K	K/KH	Y	Lecture, Small group Discussion, Bedside clinic	Written/ Viva voce OSCE			General Medicine
OR11.1	Describe and discuss the aetiopathogenesis, Clinical features, Investigations and principles of management of peripheral nerve injuries in diseases like foot drop, wrist drop, claw hand, palsies of Radial, Ulnar, Median, Lateral Popliteal and Sciatic Nerves	K	K/H	Y	Lecture Small Group discussion, case discussion	Written/ Viva voce OSCE		Human Anatomy	General Medicine, General surgery
Physical Medicine & Rehabilitation									
PM1.2	Define and describe disability, its cause, and magnitude, identification and prevention of disability	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine Orthopedics
PM1.3	Define and describe the methods to identify and prevent disability	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine Orthopedics

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integration	Horizontal Integration
PM1.4	Enumerate the rights and entitlements of differently abled persons	K	K	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine Orthopedics
PM2.1	Describe the causes of disability in the patient with a cerebrovascular accident	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Human Anatomy	General Medicine
PM2.2	Describe and discuss the treatment of rigidity and spasticity	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine
PM2.3	Describe and discuss the principles of early mobilizations, mobility aids and splints	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine
PM2.4	Describe and discuss the impact of comorbidities on the rehabilitation of the patient with cerebrovascular accident	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine
PM4.1	Describe the common patterns, clinical features, investigations, diagnosis and treatment of common causes of arthritis	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine Orthopedics
PM4.5	Demonstrate correct assessment of muscle strength and range of movements	S	SH	Y	DOAP session, Bedside clinic	Skill assessment			General Medicine Orthopedics
PM6.1	Perform and demonstrate a clinical examination of sensory and motor deficits of peripheral nerve	S	SH	Y	Bedside clinic	Skill assessment			General Medicine
PM6.2	Enumerate the indications and describe the principles of nerve conduction velocity and EMG	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine
PM7.4	Assess bowel and bladder function and identify common patterns of bladder dysfunction	S	KH	Y	Small group discussion	Written/ Viva voce			General Medicine Orthopedics
PM7.6	Enumerate the indications and describe the pharmacology and side effects of commonly used drugs in neuropathic bladder	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		Pharmacology	General Medicine
PM7.7	Enumerate and describe common life threatening complications following SCI like Deep vein Thrombosis, Aspiration Pneumonia, Autonomic dysreflexia	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			General Medicine Orthopedics

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH / SH/P	Core Y/ N	Suggested Learning methods	Suggested Assessment methods	Number required to certify P	Vertical Integra

Elicit a detailed clinical history

PM8.1	Describe the clinical features, evaluation, diagnosis and management of disability following traumatic brain injury	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		
PM8.2	Describe and discuss cognitive dysfunction like deficits in attention, memory and communication	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		
PM8.3	Describe and discuss common behavior and mood changes following TBI	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		
PM8.4	Describe metabolic co-morbidities like SIADH, diabetes mellitus, insipidus and endocrine dysfunction following TBI	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		
PM8.5	Describe the Vocational opportunities and community-based rehabilitation following TBI	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce		
PM 9.1	Describe rehabilitative aspects as they pertain to the elderly including patients with dementia, depression, incontinence immobility and nutritional needs	K	KH	Y	Lecture, Small group	Written Viva voce		
Radiotherapy								
RT1.3	Enumerate, describe and discuss classification and staging of cancer (AJCC, FIGO etc.)	K	KH	Y	Lecture	Written/ Viva voce		Pathology

(F)CERTIFIABLE PROCEDURAL SKILLS

Perform a thorough physical examination of all the systems
Perform Glucometer Random Blood sugar
Demonstrate Mantoux test
Demonstrate sampling of blood for culture
Demonstrate IV- Infusions, Intravenous injections, Intravenous canulation
Demonstrate ECG recording and interpret ECG
Demonstrate Pleural tap , Lumbar puncture
Demonstrate Cardio Pulmonary Resuscitation (CPR)
Blood and blood components matching and transfusions
Demonstrate Arterial puncture for ABG
List the indications and contraindications for Bone marrow aspiration and biopsy and demonstrate the procedure.
Demonstrate Abdominal paracentesis - diagnostic
Demonstrate the steps involved in Nebulization, Inhaler therapy, Oxygen delivery
Demonstrate Endotracheal intubation in a manikin.

Demonstrate Feeding tube/Ryle's tube, stomach wash Naso-gastric intubation in a manikin
Demonstrate Urinary catheterization – male and female in a manikin
Demonstrate Urine protein, sugar, microscopy, Peripheral blood smear, Malarial smear
Demonstrate Ziehl Nielson smear-sputum, gastric aspirate Gram's stain smear-CSF, pus

(H)

ATTENDANCE, PROGRESS AND CONDUCT

The eligibility is calculated by considering the internal assessment/monthly assessment. (average should be 40% in theory and practical separately and 50% in theory and practical combined).

Attendance should be 75/80% separately in Theory, Clinicals.

If a student is found not to meet the criteria of eligibility for summative examination, remedial measures in the form of improvement tests/assignments should be given. The student can be allowed to take up summative examination if the remedial measures are fulfilled.

The internal assessment will appear as a separate subheading in the marks card and not be considered for pass criteria of summative examination.

No candidate is permitted to run or work in clinic/laboratory/nursing home while studying the course. No candidate shall join any other course of study or appear for any other examination conducted by this university or any other university in India or abroad during the period of study.

Every student shall attend clinics and lectures during each year as prescribed by the department and not absent himself / herself from work without valid reasons.

(I) TEACHING LEARNING METHODS

Didactic lectures; seminars, symposia, reviews, and guest lectures should get priority for acquiring theoretical knowledge. Bedside teaching, grand rounds, interactive group discussions and clinical demonstrations should be the hallmark of clinical/practical learning. Students should have hands-on training in performing various procedures and ability to interpret results of various tests/investigations.

Exposure to newer specialized diagnostic/therapeutic procedures should be given. Importance should be attached to ward rounds especially in conjunction with emergency admissions. Supervision of work in outpatient department should cover the whole range of work in the unit. The development of independent skills is an important facet of training.

The training techniques and approach should be based on principles of adult learning. It should provide opportunities initially for practicing skills in controlled or simulated situations. Repetitions would be necessary to become competent or proficient in a particular skill. The more realistic the learning situation, the more effective will be the learning.

Clinical training should include measures for assessing competence in skills being taught and providing feedback on progress towards a satisfactory standard of performance. Time must be available for academic work and audit. The following is a rough guideline to various teaching/learning activities that may be employed:

1. Ward rounds along with emergency admissions.
2. Skills training
3. Didactic lecture
4. Maintenance of records.
5. **Log books** should be maintained to record the work done which shall be checked and assessed periodically by the faculty members imparting the training.
6. Department should encourage e-learning activities.

15. During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently; for this purpose, provision of skills laboratories in the medical colleges is mandatory.

(J) INNOVATIVE TEACHING LEARNING PRACTICES

1. Training in Skills lab using high fidelity manikins.
2. Sessions on Problem Based Learning.
3. OSCE method of teaching learning and assessments.
4. Training in Geriatrics including Comprehensive Geriatric assessment, Counselling, Vaccination.

(K) ASSESSMENT METHODS:

Formative Assessment:

1. The department follows the concept of continuous assessment for evaluating the students. The department of Medicine will conduct monthly tests and three internal assessments.
2. This facilitates to give feedback to students on their learning. These tests allow regular and timely revision by the students. It also prepares the student to attend the summative examination with confidence.
3. The department will conduct a minimum of three internal assessments.
4. The third internal assessment will be as per university summative examination.
5. The marks obtained in the formative assessment should be displayed on the notice board within 1 -2 weeks after conducting the tests.

Theory:

The theory paper will be conducted for 60 MARKS (This will be reduced to 30 marks)

Blue print guidelines to be followed for question paper setting.

The distribution of marks will be as follows:

- i. 40% of the subject questions will be based on clinical correlation and integration (LE, SE).
- ii. 40% of the subject questions will and comprehension level of questions (SE).
- iii. 20% of the subject questions will be of recall type. (SAQs and MCQs).

FORMATIVE ASSESSMENT	SUMMATIVE ASSESSMENT
Formative assessment will be continual and should will medical knowledge, procedural & academic skills, interpersonal skills, professionalism, self-directed learning. Formative assessment – Clinicals – Will be conducted in Phase II, Phase III Part I and Phase III part II (Marks – 40) Formative assessment – Theory – Will be conducted Phase II, Phase III Part I and Phase III part II (Marks – 40)	The summative examination would be carried out as per the Rules given in UNDERGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.
Methods of assessments 1. OSCE 2. Case presentations 3. MCQs 4. Long essay questions	The Undergraduate examination shall be in two parts: 1. Theory: The examinations shall be organised on the basis of ‘Grading ‘or ‘Marking system’ to evaluate and to certify student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 50% marks in ‘Theory’ as well as ‘Practical’ separately shall be mandatory for

5. Short essay questions 6. Viva Candidate must score minimum of 50% of the marks in all the assessments in order to be eligible for the summative assessments.	passing examination as a whole. The examination shall be held at the end of 4th academic year. There will be two theory papers, as below: Paper I: Basic Medical Sciences, Medicine and allied specialties including paediatrics, dermatology & psychiatry, Tropical Medicine and Infectious Diseases Paper II: Diseases and management of other organ systems and recent advances 3. Clinical / Practical and Oral/viva voce Examination: The final clinical examination should include: • cases pertaining to major systems • stations for clinical, procedural and communication skills • Log Book Records and day-to-day observation during the training • Oral/viva voce examination shall be comprehensive enough to test the student's overall knowledge of the subject

Guidelines for Internal assessment:

1. The department will conduct a minimum of three internal assessments.
2. The third internal assessment will be as per university summative examination.
3. The marks obtained in the formative assessment will be displayed on the notice board within 1 -2 weeks after conducting the tests.

Theory:

- The theory paper will be conducted for 60 marks.
- Blue print guidelines to be followed for question paper setting.

- The distribution of marks will be as follows:
 - 40% of the subject questions will be based on differential diagnosis, clinical management plan, complication. (LE, SE).
 - 40% of the subject questions will and comprehension level of questions (SE).
 - 20% of the subject questions will be of recall type. (SAQs and MCQs).
- Each Internal assessment weightage will be as follows:

Sl No	Topics	Weightage
1.	Etiopathogenesis, Clinical features	40%
2.	Differential Diagnosis, Investigation, Treatment, Complications	40%
3.	Basic Science, Recent advances	10%
4.	Dermatology, Psychiatry	10%

Scheme of Internal assessment - Theory

Sl.No	Type of question	Marks
1.	Long essays	1X10=10
2.	Short essays	5X5=25
3.	Short answers	5X3=15
4.	MCQs	1X10=10

Scheme of Internal assessment – Clinical (60 marks)

Phase II – OSCE

Phase III, Part I and II – Case Presentation (One Clinical Case) (40 marks)

Case presentation	Marks
History taking	5
Communication skills	5
General Physical examination and vitals	10
Systemic examination	10
Differential Diagnosis	5
Investigations and treatment	5

Total	40

Format of MBBS theory and practical's exams as per curriculum – General Medicine

Department	Internal assessment - Theory (Total number, Format & marks)	Internal assessment – Practical / bedside (Total number, Format & marks)	Summative assessment – Theory (Format & marks)	Summative assessment - Practical / bedside (Format & marks)
General Medicine	Number – 3 Marks – 60 marks Format Long essay: 1X10=10 Short essay: 5X5=25 Short answers 5X3=15 MCQs- 1X10=10 (IA theory marks will be reduced to 40 marks and sent to university)	Number-3 Marks – 40 Format Phase II- OSCE (30 marks) Phase III part I & II One clinical case presentation (30 marks) Logbook – 5 marks Professionalism- 5 marks	Total – 200 marks No. of papers- 2 Marks – 100 Format Long essay – 2X10=20 Short essay- 8X5=40 Short answers- 10X3=30 MCQs: 1X10=10	Total: 100 marks Long case – 1 (40 marks) Short case – 2 (20 marks each; 20X2=40) Viva (20 marks) X-rays – 5 marks Instruments- 5 marks Drugs- 5 marks Charts – 5 marks

The log book should be evaluated on a continuous basis and certified by the department before the summative examination
The pass criteria in each internal assessment will be 40% separately in theory and practical.

Eligibility criteria to take up summative examination, theory and practical cumulative should be 50%. Regular monthly tests will be conducted in addition to the three internal assessments. These will be in the form of SAQ test, MCQ test, SE test, Table viva, Spotter tests etc.
These will be given weightage when considering internal assessment eligibility for summative examination.

LOG BOOK:

The log book should be completed and evaluated by the faculty on a timely basis. The same to be certified by the head of the department at the end of the program before summative examination.

	THEORY		CLINICALS	
1.	Internal assessment	40	Clinical assessment	25
			Log book	5
			Case sheet writing	5
			Professionalism	5
	TOTAL	40	TOTAL	40

Summative Assessment:

Theory - Marks Distribution:

Sl. No	Questions	Marks
1.	Long essays	2X10=20
2.	Short essays	8X5=40
3.	Short answers	10X3=30
4.	MCQs	10X1=10
	Total	100

The portions in the first and second paper

Paper I – Infectious diseases, Environmental diseases, Toxins, Envenomation, Haematology, Basic sciences, Psychiatry and Dermatology

Paper II – Nephrology, Cardiology, Neurology, Rheumatology, Endocrinology, Respiratory system, Gastroenterology, Recent advances

Pattern of question paper

Clinicals- Pattern and Marks distribution

Sl.No	Case Presentation	Marks
1.	Long Case	80
2.	Short Case- 1	40
3.	Short Case-2	40
4.	Viva (Chest X ray, Charts, Instruments, Drugs)	40

Blue Printing

Paper – I

1.	Long Essay 1	Infectious disease
2.	Long Essay 2	Haematology/Toxin/Envenomation
3,	Short Essay 1	Psychiatry
4.	Short Essay 2	Dermatology
5.	Short Essay 3	Toxins/Envenomation
6.	Short Essay 4	Environment/ Nutrition
7.	Short Essay 5	Epidemiology, pathogenesis of Infectious disease- Bacterial
7.	Short Essay 6	Treatment, Complication of Infectious disease- Viral
9.	Short Essay 7	Treatment, Complication of Infectious disease- Protozoal
10.	Short Essay 8	Treatment, Complication of Infectious disease- Protozoal
11	Short answers	Vaccination
12	Short answers	Treatment
13	Short answers	Complication of infectious disease
14	Short answers	Clinical features
15	Short answers	Treatment
16	Short answers	Complication of infectious disease
17	Short answers	Treatment
18	Short answers	Clinical features
19	Short answers	Complication of infectious disease
20	Short answers	Treatment

Paper – II

1.	Long Essay 1	Cardiology/Nephrology/Neurology
2.	Long Essay 2	Endocrinology/Rheumatology/Respiratory system
3,	Short Essay 1	Cardiology
4.	Short Essay 2	Neurology
5.	Short Essay 3	Pulmonology
6.	Short Essay 4	Endocrinology
7.	Short Essay 5	Rheumatology
7.	Short Essay 6	Nephrology
9.	Short Essay 7	Emergency Medicine
10.	Short Essay 8	Gastroenterology
11	Short answers	Drugs
12	Short answers	Treatment
13	Short answers	Complication of infectious disease
14	Short answers	Clinical features
15	Short answers	Treatment
16	Short answers	Complication of infectious disease
17	Short answers	Treatment
18	Short answers	Clinical features
19	Short answers	Complication of infectious disease
20	Short answers	Treatment

Pass Criteria:

The student should secure 40% in each theory paper and 50% of aggregate of the two papers.

The student should secure 50% in practical exam + viva.

Supplementary Exam:

Supplementary exams to be conducted and results to be declared within 60 days after announcement of results of main summative examination.

(L) STUDY MATERIAL/REFERENCES

Text Books	Reference books	Clinical methods
Davidson's Principles and Practice of Medicine	Hurst : The Heart	Hutchinson's Clinical Methods
API Text book of Medicine	Braunwald - Heart Disease: A Textbook of Cardiovascular Medicine	Macleod's Clinical examination
Kumar & Clark : Book of Clinical Medicine	Marriot's Practical Electrocardiography	John Patten : Neurological Differential Diagnosis
Harrison's Principles & Practice of Medicine	Crofton and Douglas : Respiratory Diseases	Neurological examination in Clinical Practice by Bickerstaff
Oxford Text book of Medicine	Brain's Diseases of the Nervous system	
Manson's Tropical Diseases	Adam's Principles of Neurology	
Cecil : Text Book of Medicine	William's Text Book of Endocrinology	
	De Gruchi's Clinical Hematology in Medical Practice	
	Kelly's Text Book of Rheumatology	
	Slesenger&Fordtran : Gastrointestinal and Liver disease	

(M) BLUE PRINT OF THE POSTINGS AND TECHING PROGRMMES OF THE STUDENTS

Time	Content	Postings	Teaching programmes

Phase II	Basic Cognitive and communication skills Symptomatology, Infectious diseases Procedural abilities OPD & ward work	Wards OPD	Intensive training in the basics of Medicine. Eliciting Clinical History General Physical Examination Vital signs examination Systemic Examination Communication skills Student-doctor programme
Phase III, Part I	Toxicology, Environmental diseases, Haematology, Rheumatology, Endocrinology	Wards OPD	Systemic examination Differential diagnosis Case Presentations Student-doctor programme Communication skills
Phase III, Part II	Cardiology, Endocrinology, Respiratory system, Neurology, Nephrology, Endocrinology.	Wards, OPD	Differential Diagnosis Management Plan Investigations Management Prevention Prognosis Counselling

CHECK-LIST FOR EVALUATION OF CLINICAL SEMINAR

Name of the Student:

Name of the Faculty/Observer:

Sl. No	Parameters	Poor(0)	Below Average (1)	Average (2)	Good (3)	Very Good (4)
1.	Completeness of history					
2.	Clarity of presentation					
3.	Logical order					
4.	Mentioned all positive and negative points of importance					
5.	Accuracy of general physical examination					
6.	Whether all physical signs elicited correctly					
7.	Differential Diagnosis and approach to diagnosis					
8.	Investigations Relevance, order and rationale					
9.	Clinical reasoning					
10.	Ability to defend the questions					

Logbook entry

Date	
Setting/method	

Presented/attended	
Summary in brief	
Reflection	
Teachers comments	

Student's signature

Guide's Signature



Curriculum for Paediatrics 2022



**Ramaiah Medical College
Ramaiah University of Applied Sciences
Bengaluru-560054**

PEDIATRICS

INTRODUCTION TO THE DEPARTMENT

The Department of Pediatrics has state of the art facilities, offering an unparalleled opportunity to study pediatrics, neonatology with other subspecialties of pediatrics. The Department seeks to educate and inspire the next generation of pediatricians by providing quality training through scientific excellence.

Teaching staff comprises of qualified pediatricians and neonatologists, training students to be adept with knowledge and skills required to diagnose and treat children that they may face in their professional career. The department renders round the clock services in outpatient, emergency and intensive care services in neonatal and pediatric age groups.

The course is designed to teach students with a systematic instruction in normal growth and development, nutritional needs of a child, immunization schedules and management of common diseases of infancy and childhood, scope of Social Pediatrics and counseling. They will be taught the abnormalities in the various systems, the approach to the diagnosis of the conditions, investigations and management.

The NMC Pediatric UG Curriculum 2019, has 35 topics with 406 competencies covering various domains of learning i.e., knowledge, skill, attitude and communication. The competencies will be covered during the raining period of Phase II MBBS, Phase III part I MBBS & Phase III part II MBBS.

AIM:

To impart appropriate knowledge and skills needed to ensure optimal growth and development of children and also manage the major health problems through innovative teaching and research

GOALS:

To manage common diseases, to evaluate growth, development and nutritional needs, and to know immunization schedule of infancy, childhood and adolescents and to acquire skills in counseling.

COURSE OUTCOMES:

1. Acquire adequate knowledge and appropriate skills and recognize the health needs of infants, children and adolescents to deal with their major health problems
- 2) Acquire the competencies pertaining to pediatrics-preventive, diagnostic and therapeutic that are required to be practiced in the community and at all levels of health system
- 3) Acquire skills in effectively communicating and counselling with the child, family and the community

- 4) Be aware of principles of research methodology, contemporary advances and developments in medical sciences as related to child health
- 5) Understand and follow the principles of the National Health Policy and professional ethics.

OBJECTIVES:

The student at the end of the course will be able to:

Cognitive domain:

1. Describe normal growth and development during fetal, neonatal, child and adolescence period.
2. Describe the common pediatric disorders and emergencies in terms of epidemiology, etiopathogenesis clinical manifestations, diagnosis, rational therapy and rehabilitation.
3. State age related requirements of calories, nutrients, fluids, drugs etc. in health and disease.
4. Describe preventive strategies for common infectious disorders, poisonings, accidents and child abuse.
5. Outline national programs relating to child health including immunization programs.

Psychomotor domain

1. Take a detailed pediatric history, conduct an appropriate physical examination of children including neonates, make clinical diagnosis, conduct common bedside investigative procedures, interpret common laboratory investigation results and plan and institute therapy.
2. Distinguish between normal newborn babies and those requiring special care and institute early care to all newborn babies including care of preterm and low birth weight babies.
3. Take anthropometric measurements, resuscitate newborn infants at birth, prepare oral rehydration solution, perform tuberculin test, administer vaccines available under current national programs, perform venesection, start an intravenous line and provide nasogastric feeding.
4. Would have observed procedures such as lumbar puncture, liver and kidney biopsy, bone marrow aspiration, pleural tap and ascitic tap.
5. Provide appropriate guidance and counseling in breast feeding.
6. Provide ambulatory care to all sick children, identify indications for specialized/inpatient care and ensure timely referral of those who require hospitalization.
7. Be aware and analyze ethical problems that arise during practice and deal with them in an acceptable manner following the code of ethics.

Affective domain:

Provide appropriate guidance and counseling

Integration

The training in pediatrics should prepare the student to deliver preventive, promotive, curative and rehabilitative services for care of children both in the community and at hospital as part of a team in an integrated form with other disciplines e.g. Anatomy, Physiology, Forensic medicine, Community Medicine and Physical Medicine and Rehabilitation.

Competencies in Phase II MBBS, Phase III part 1 MBBS, , Phase III part 2 MBBS		
No .	Topic(35)	Compete ncies (406)
1	Normal Growth and Development	07
2	Common problems related to Growth	06
3	Common problems related to Development -1	08
4	Common problems related to Development-2 (Scholastic backwardness, Learning Disabilities, Autism, ADHD)	06
5	Common problems related to behavior	03
6	Adolescent Health & common problems related to Adolescent Health	13
7	To promote and support optimal Breastfeeding for Infants	11
8	Complementary Feeding	05
9	Normal nutrition, assessment and monitoring	07
10	Provide nutritional support, assessment and monitoring for common nutritional problems	06
11	Obesity in children	06
12	Micronutrients in Health and disease-1 (Vitamins ADEK, B Complex and C)	21
13	Micronutrients in Health and disease -2: Iron, Iodine, Calcium, Magnesium	14
14	Toxic elements and free radicals and oxygen toxicity	05
15	Fluid and electrolyte balance	07
16	Integrated Management of Neonatal and Childhood Illnesses (IMNCI) Guideline	03
17	The National Health programs, NHM	02
18	The National Health Programs: RCH	08

19	National Programs, RCH-Universal Immunization program	16
20	Care of the Normal Newborn and High risk Newborn	20
21	Genito-Urinary system	17
22	Approach to and recognition of a child with possible Rheumatologic problem	03
23	Cardiovascular system- Heart Diseases	18
24	Diarrheal diseases and Dehydration	17
25	Malabsorption	01
26	Acute and chronic liver disorders	13
27	Pediatric Emergencies – Common Pediatric Emergencies	35
28	Respiratory system	20
29	Anemia and other Hemato-oncologic disorders in children	20
30	Systemic Pediatrics-Central Nervous system	23
31	Allergic Rhinitis, Atopic Dermatitis, Bronchial Asthma, Urticaria Angioedema	12
32	Chromosomal Abnormalities	13
33	Endocrinology	11
34	Vaccine preventable Diseases-Tuberculosis	20
35	The role of the physician in the community	01

MINIMUM TEACHING HOURS

	Lectures	Small group learning (Tutorials / Seminars/ Integrated learning	Self - Directed Learning	Total	Clinical posting
Phase II	--	--	--	- -	2 weeks
Phase III part 1	20hours	30 hours	05hours	55hours	4weeks
Phase III part 2	20hours	35 hours	10 hours	65 hours	4weeks
Total	20hours	65 hours	15 hours	120 hours	10weeks

Teaching Learning Methods:

The university incorporates the guidelines of the CBME curriculum prescribed by the National Medical Commission (NMC). The department uses various innovative teaching learning methods to facilitate effective student learning.

Lectures

Seminars

Self-directed learning

Skill laboratory

SYLLABUS:

Theory:

List of Competencies and SLOs to be covered in Phase III part1 MBBS

PE1.1 Define the terminologies Growth and Development and Discuss the factors affecting normal growth and development

1.1.1 Define Growth and Development

1.1.2 Enumerate the factors affecting normal growth and development

PE1.2 Discuss and Describe the patterns of growth in infants, children and adolescents

1.2.1 Describe the patterns of growth in infants, children and adolescents

PE1.3 Discuss and Describe the methods of assessment of growth including use of WHO and Indian national standards. Enumerate the parameters used for assessment of physical growth in infants, children and adolescents

1.3.1 Describe the methods of assessment of growth including use of WHO and Indian national standards.

1.3.2 Describe WHO and Indian national standards for growth of infants, children and adolescents.

1.3.3 Enumerate the parameters used for assessment of physical growth in infants, children and adolescents.

PE 1.5 Define development and Discuss the normal developmental milestones with respect to motor, behavior, social, adaptive and language

1.5.1 Define development.

1.5.2 Describe the normal developmental milestones with respect to motor, behavior, social, adaptive and language domains.

PE 1.6 Discuss the methods of assessment of development.

1.6.1 Discuss the methods of assessment of development

PE 2.1 Discuss the etiopathogenesis, clinical features and management of a child who fails to thrive

2.1.1 Discuss the etiopathogenesis of a child who fails to thrive.

2.1.2 Describe the clinical features of a child who fails to thrive.

9.1.3 Describe the nutritional needs (calorie, protein, micronutrients minerals and vitamins) for children of different ages.

9.1.4 Describe the nutritional needs (calorie, protein, micronutrients minerals and vitamins) of adolescents of both genders.

P E 9.2 Describe the tools and methods for assessment and classification of nutritional status of infants, children and adolescents

9.2.1 List the tools required for anthropometric measurements viz. weight, length/height, head circumference, midarm circumference.

9.2.2 Describe the method of assessment in detail for different anthropometric measurements for all age groups.

9.2.3 Classify the nutritional status as per WHO classification based on anthropometric measurement data for all age groups.

P E 9.3 Explains the calorific value of common Indian foods

9.3.1 Explain the calorie and protein content of commonly used uncooked and cooked cereals.

9.3.2 Explain the calorie and protein content of common uncooked food items like dairy products, eggs, fruits, vegetables etc.

9.3.3 Explain the calorie and protein content of common Indian cooked food items e.g. Dalia, roti, chapati, khichdi, dal, rice, idli.

P E 10.1 Define and Describe the etiopathogenesis, classify including WHO classification, clinical features, complication and management of severe acute malnourishment (SAM) and moderate acute Malnutrition (MAM)

10.1.1 Define malnutrition as per WHO.

10.1.2 Describe the etiology of malnutrition.

10.1.3 Discuss the pathophysiology of malnutrition.

10.1.4 Classify the malnutrition as per WHO.

10.1.5 Describe the criteria for severe acute malnutrition (SAM) and moderate acute malnutrition (MAM) as per WHO.

- 10.1.6 Describe the clinical features of MAM and SAM including marasmus and kwashiorkor.
- 10.1.7 Describe the complications of SAM.
- 10.1.8 Describe the steps of management of SAM involving stabilization and rehabilitation phase.
- 10.1.9 Describe the domiciliary management of moderate acute malnutrition (MAM).

P E 10.2 Outline the clinical approach to a child with SAM and MAM

- 10.2.1 Describe the clinical approach (algorithmic approach including clinical history, examination and investigations) to a child with SAM and MAM.

P E 10.6 Enumerate the role of locally prepared therapeutic diets and ready to use therapeutic diets

- 10.6.1 Enumerate the composition of Ready to use therapeutic foods (RUTF).
- 10.6.2 Enumerate the locally available home food prepared with cereals, pulses, sugar, oil, milk and/ or egg etc.
- 10.6.3 Discuss the role of RUTF/locally prepared food to achieve catch-up growth in malnourished child.

PE 14.1 Discuss the risk factors, clinical features, diagnosis and management of Lead Poisoning

- 14.1.1 Enumerate the risk factors for lead poisoning in children.
- 14.1.2 Describe the clinical features of lead poisoning.
- 14.1.3 Discuss the diagnosis of lead poisoning.
- 14.1.4 Describe the management of a child with lead poisoning including prevention.

PE 14.2 Discuss the risk factors, clinical features, diagnosis and management of Kerosene aspiration

- 14.2.1 Enumerate the risk factors for kerosene aspiration.
- 14.2.2 Describe the clinical features of kerosene aspiration.
- 14.2.3 Discuss the diagnosis of kerosene aspiration.
- 14.2.4 Describe the management of a child with kerosene aspiration.

PE 14.3 Discuss the risk factors, clinical features, diagnosis and management of Organophosphorus poisoning

- 14.3.1 Enumerate the risk factors for organophosphorus poisoning.
- 14.3.2 Describe the clinical features of organophosphorus poisoning.
- 14.3.4 Discuss the diagnosis of organophosphorus poisoning.
- 14.3.5 Describe the management of a child with organophosphorus poisoning.

PE 14.4 Discuss the risk factors, clinical features, diagnosis and management of paracetamol poisoning

- 14.4.1 Enumerate the risk factors for paracetamol poisoning.
- 14.4.2 Describe the clinical features of paracetamol poisoning.
- 14.4.3 Discuss the diagnosis of paracetamol poisoning.

14.4.4 Discuss the management of a child with paracetamol poisoning including prevention.

PE 20.1 Define the common neonatal nomenclatures including the classification and describe the characteristics of a Normal Term Neonate and High Risk Neonates

20.1.1 Define the Neonatal and Perinatal period.

20.1.2 Define live birth and still birth.

20.1.3 Classify the neonate according to birth weight into different categories.

20.1.4 Classify the neonate according to period of gestation.

20.1.5 Classify the neonate as per intrauterine growth percentiles.

20.1.6 Define Neonatal Mortality Rate (NMR) and Perinatal Mortality Rate.

20.1.7 Describe the characteristics of a normal term neonate.

20.1.8 Describe the characteristics of the high-risk neonate.

PE 20.2 Explain the care of a normal neonate

20.2.1 Enumerate the components of Essential Newborn Care

20.2.2 Enumerate the steps of care of the normal neonate at birth.

20.2.3 Explain the care of the normal neonate during the postnatal period.

20.2.4 List the criteria for discharge of a normal neonate from the hospital

PE 22.2 Counsel a patient with Chronic illness

22.2.1 Counsel a child / parents of a child with a chronic illness.

PE 24.1 Discuss the etiopathogenesis, classification, clinical presentation and management of diarrheal diseases in children.

24.1.1 Explain etiopathogenesis of Diarrheal diseases in children.

24.1.2 Classify Diarrheal disease based on duration and etiology.

24.1.3 Describe symptoms and signs of Diarrheal disease in children.

24.1.4 Enumerate investigations required for Diarrheal disease in children.

24.1.5 Outline the treatment plan of Diarrheal disease in children.

PE 24.2 Discuss the classification and clinical presentation of various types of diarrheal dehydration

24.2.1 Enumerate all the signs and symptoms of dehydration in children.

24.2.2 Classify dehydration as per WHO guidelines.

24.2.3 Enumerate the clinical features of dehydration of different severity.

PE 24.3 Discuss the physiological basis of ORT, types of ORS and the composition of various types of ORS in children

24.3.1 Explain pathophysiology of fluid and electrolyte loss in Diarrheal diseases.

24.3.2 State the basis of fluid and electrolyte replacement in Diarrheal diseases.

24.3.3 Recall composition of WHO standard ORS.

24.3.4 Recall composition of other type of ORS viz Resomal, Low osmolarity ORS.

PE 24.4 Discuss the types of fluid used in Pediatric diarrheal diseases and their composition

24.4.1 Enumerate the types of fluids used in management of dehydration in children.

24.4.2 Describe the composition of Ringer lactate and Normal saline and rationale of their use in correction of dehydration.

PE 24.5 Discuss the role of antibiotics, antispasmodics, anti-secretory drugs, probiotics, anti-emetics in acute diarrheal diseases

24.5.1 Describe harmful practices in treatment of diarrheal diseases in children

24.5.2 Enumerate the indications of antibiotic therapy in diarrheal diseases in children

24.5.3 Describe role, dosage and duration of Zinc therapy in Diarrheal diseases in children

24.5.4 Interpret selective role of probiotics, anti-secretory drugs, antispasmodics and antiemetics in acute diarrheal diseases.

PE 24.6 Discuss the causes, clinical presentation and management of persistent diarrhea in children

24.6.1 Define Persistent diarrhea in children.

24.6.2 Enumerate causes of persistent diarrhea in children.

24.6.3 Describe clinical presentation in child with persistent diarrhea.

24.6.4 List investigations in persistent diarrhea.

24.6.5 Outline the treatment plan in persistent diarrhea.

PE 24.7 Discuss the causes, clinical presentation and management of chronic diarrhea in children.

24.7.1. Define chronic diarrhea in children.

24.7.2 Enumerate the common causes of chronic diarrhea in children.

24.7.3 Describe symptoms and signs of chronic diarrhea.

24.7.4 Enumerate investigations for chronic diarrhea.

24.7.5 Outline treatment of chronic diarrhea.

24.7.6 Identify need of referral in a case of chronic diarrhea.

PE 24.8 Discuss the causes, clinical presentation and management of dysentery in children

24.8.1 Define dysentery in children.

24.8.2 Enumerate the etiological agents causing dysentery in children.

24.8.3 Describe symptoms and signs of dysentery in children.

24.8.4 Outline the antibiotic therapy in children with dysentery.

PE 25.1 Discuss the etiopathogenesis, clinical presentation and management of Malabsorption in Children and its causes including celiac disease.

25.1.1 Define malabsorption in children.

25.1.2 Enumerate causes of malabsorption in children.

25.1. 3 Describe etiopathogenesis of malabsorption in children.

25.1.4 Describe common symptoms and signs of malabsorption in children.

25.1.5 Describe presentations of celiac disease in children.

25.1.6 Enumerate investigations in case of celiac disease.

25.1.7 Enumerate steps of treatment plan in case of celiac disease.

PE 34.18 Enumerate the common causes of fever and discuss the etiopathogenesis, clinical features, complications and management of child with Dengue, Chikungunya and other vector borne diseases

34.18.1 Enumerate common causes of fever resulting from vector borne diseases in children (E.g. Dengue, Chikungunya and others)

34.18.2 discuss the pathophysiology of vector borne diseases in children (E.g. Dengue, Chikungunya, and others)

34.18.3 list the clinical features of vector borne diseases in children (e.g. Dengue, Chikungunya, and others)

34.18.4 recall the complications of vector borne diseases in children (e.g. Dengue, Chikungunya, and others)

34.18.5 elaborate the management of vector borne diseases in children (e.g. Dengue, Chikungunya, and others)

PE 34.19 Enumerate the common causes of fever and discuss the etiopathogenesis, clinical features, complications and management of children with Common Parasitic Infections, malaria, leishmaniasis, filariasis, helminthic infestations, amebiasis, giardiasis

34.19.1 Enumerate the common causes of fever resulting from parasitic infections like malaria, leishmaniasis, filariasis, helminthic infestations, amebiasis and giardiasis.

34.19.2 Discuss the pathophysiology of Common Parasitic Infections like malaria, leishmaniasis, filariasis, helminthic infestations, amebiasis and giardiasis

34.19.3 List the clinical features of Common Parasitic Infections like malaria, leishmaniasis, filariasis, helminthic infestations, amebiasis and giardiasis

34.19.4 Recall the complications of Common Parasitic Infections like malaria, leishmaniasis, filariasis, helminthic infestations, amebiasis and giardiasis

34.19.5 Elaborate the management of Common Parasitic Infections like malaria, leishmaniasis, filariasis, helminthic infestations, amebiasis and giardiasis

PE 27.8 Discuss the common types, clinical presentations and management of poisoning in children

27.8.1 Enumerate the common poisoning in children.

27.8.1 Elaborate on the clinical sign and symptoms of common poisoning in children (kerosene, organophosphorus, paracetamol and corrosive).

27.8.1 Discuss the management of common poisoning in children (kerosene, organophosphorus, paracetamol and corrosive).

PE 30.2 Distinguish bacterial, viral and tuberculous meningitis

30.2.1 Differentiate the clinical features of bacterial, viral and tubercular meningitis in a child

30.2.2 Differentiate the cerebrospinal fluid (CSF) picture of bacterial, viral and tubercular meningitis in a child

PE 34.1 Discuss the epidemiology, clinical features, clinical types, complications of Tuberculosis in Children and Adolescents

34.1.1 discuss the epidemiology of Tuberculosis in Children and Adolescents

34.1.2 Describe the clinical features of Tuberculosis in Children and Adolescents

34.1.3 Enumerate the clinical types of Tuberculosis in Children and Adolescents

34.1.4 List the complications of Tuberculosis in Children and Adolescents

PE 34.2 Discuss the various diagnostic tools for childhood tuberculosis

34.2.1 Describe the various diagnostic tools for childhood tuberculosis

PE 34.3 Discuss the various regimens for management of Tuberculosis as per National Guidelines

34.3.1 Describe the various regimens for management of Tuberculosis as per National Guidelines

PE 34.4 Discuss the preventive strategies adopted and the objectives and outcome of the National Tuberculosis Program

34.4.1 Describe the preventive strategies adopted under the National Tuberculosis Program

34.4.2 List the objectives of the National Tuberculosis Program

34.4.3 Discuss the outcome of the National Tuberculosis Program

PE 34.5 Able to elicit, document and present history of contact with tuberculosis in every patient encounter

34.5.1 Elicit history of contact with tuberculosis in every patient encounter

34.5.2 Document history of contact with tuberculosis in every patient encounter

34.5.3 Present history of contact with tuberculosis in every patient encounter

PE 34.9 Interpret blood tests in the context of laboratory evidence for tuberculosis

34.9.1 interpret blood tests in the context of laboratory evidence for tuberculosis

PE 34.10 Discuss the various samples for demonstrating the organism e.g. Gastric Aspirate, Sputum, CSF, FNAC

34.10.1 Describe the various samples for demonstrating the mycobacteria e.g. Gastric Aspirate, Sputum, CSF, FNAC

PE 34.12 Enumerate the indications and discuss the limitations of methods of culturing M. Tuberculosis

34.12.1 Enumerate the indications of culturing M. tuberculosis

34.12.2 Enumerate the methods of culturing M. tuberculosis

34.12.3 Describe the limitations of different methods of culturing M. tuberculosis

PE 34.13 Enumerate the newer diagnostic tools for Tuberculosis including BACTEC CBNAAT and their indications

34.13.1 Enumerate the newer diagnostic tools for Tuberculosis including BACTEC and CBNAAT

34.13.2 recall the indications for using the newer diagnostic tools for Tuberculosis including BACTEC and CBNAAT

PE 34.15 Enumerate the common causes of fever and discuss the etiopathogenesis, clinical features, complications and management of child with exanthematous illness like Measles, Mumps, Rubella & Chicken pox

34.15.1 Enumerate the common causes of exanthematous illness (fever with rash) in children

34.15.2 discuss the pathogenesis of Measles, Mumps, Rubella & Chicken pox

34.15.3 Describe the clinical features of Measles, Mumps, Rubella & Chicken pox in children and adolescents

34.15.4 Enumerate the complications of Measles, Mumps, Rubella & Chicken pox in children and adolescents

34.15.5 outline the management of Measles, Mumps, Rubella & Chicken pox in children and adolescents

PE 34.16 Enumerate the common causes of fever and discuss the etiopathogenesis, clinical features, complications and management of child with Diphtheria, Pertussis, Tetanus

34.16.1 discuss the pathogenesis of Diphtheria, Pertussis and Tetanus

34.16.2 Describe the clinical features of Diphtheria, Pertussis and Tetanus in children and adolescents.

34.16.3 Enumerate the complications of Diphtheria, Pertussis and Tetanus in children and adolescents

34.16.4 outline the management of Diphtheria, Pertussis and Tetanus in children and adolescents

PE 34.20 Enumerate the common causes of fever and discuss the etiopathogenesis, clinical features, complications and management of child with Rickettsial diseases

34.20.1 Enumerate the common causes of fever resulting from Rickettsial diseases

34.20.2 Discuss the pathophysiology of Rickettsial diseases

34.20.3 List the clinical features of Rickettsial diseases in children

34.20.4 Recall the complications of Rickettsial diseases in children

34.20.5 Elaborate the management of Rickettsial diseases in children

PE 34.17 Enumerate the common causes of fever and discuss the etiopathogenesis, clinical features, complications and management of child with Typhoid

34.17.1 discuss the pathophysiology of Typhoid fever

34.17.2 Describe the clinical features of Typhoid fever in children

34.17.3 Enumerate the complications of Typhoid fever in children

34.17.4 outline the management of Typhoid fever in children

MBBS CBME PHASE 3 PART1 BLOCK2

Topic: Common problems related to Development- Scholastic backwardness, Learning Disabilities, Autism, ADHD

PE4.1	Discuss the causes and approach to a child with scholastic backwardness
4.1.1	Define scholastic backwardness.
4.1.2	List common causes of scholastic backwardness.
4.1.3	Discuss clinical assessment of a child with scholastic backwardness.
PE4.2	Discuss the etiology, clinical features, diagnosis and management of a child with learning disabilities
4.2.1	Define learning disabilities.
4.2.2	Enumerate causes of learning disabilities.
4.2.3	Describe clinical presentation of a child with learning disabilities.
4.2.4	Discuss assessment of a child with learning disabilities.
4.2.5	Discuss management options for a child with learning disabilities.
PE4.3	Discuss the etiology, clinical features, diagnosis and management of a child with Attention Deficit Hyperactivity Disorder(ADHD)
4.3.1	Define ADHD.
4.3.2	Describe clinical features of ADHD.

4.3.3	Discuss diagnostic assessment of a child with suspected ADHD.
4.3.4	Enumerate drugs for treatment of ADHD.
PE4.4	Discuss etiology, clinical features, diagnosis and management of a child with autism
4.4.1	Define Autism Spectrum Disorders (ASD).
4.4.2	Discuss causes of ASD.
4.4.3	Describe clinical features of ASD.
4.4.4	Discuss clinical assessment of ASD.
4.4.5	Discuss management options for a child with ASD.
PE4.5	Discuss the role of Child Guidance Clinic in children with Developmental problems
4.5.1	Describe the structure of a Child Guidance Clinic with respect to staff and facilities.
4.5.2	Enumerate the functions of a child guidance clinic.
PE4.6	Visit to the Child Guidance Clinic
4.6.1	Describe the functioning of child guidance clinic in their institutions.
PE 5.1	Describe the clinical features, diagnosis and Management of thumb sucking
5.1.1	Describe clinical features of thumb sucking.
5.1.2	Describe diagnosis of thumb sucking.
5.1.3	Discuss management strategies for a child with thumb sucking.
PE 5.2	Describe the clinical features, diagnosis and management of feeding problems
5.2.1	Enumerate common feeding problems.
5.2.2	Discuss clinical presentations of feeding problems.
5.2.3	Discuss management strategies for a child with feeding problems.
PE 5.3	Describe the clinical features, diagnosis and management of nail-biting
5.3.1	Describe features of nail biting.
5.3.2	Discuss management of nail biting.
PE 5.4	Describe the clinical features, diagnosis and management of breathholding spells.
5.4.1	Describe a breath holding spell.
5.4.2	Describe the types of breath holding spells.
5.4.3	Discuss causes of breath holding spells.
5.4.4	Discuss management of breath holding spells.

PE 5.5	Describe the clinical features, diagnosis and Management of temper tantrums
5.5.1	Describe presentation of a temper tantrum.
5.5.2	Discuss causes of temper tantrum.
5.5.3	Discuss management of temper tantrums.
PE 5.6	Describe the clinical features, diagnosis and Management of pica
5.6.1	Define pica.
5.6.2	Discuss causes of pica.
5.6.3	Discuss treatment of pica.
PE 5.7	Describe the clinical features, diagnosis and Management of fussy infant
5.7.1	Describe a fussy infant.
5.7.2	Enumerate causes of fussiness in children.
5.7.3	Discuss management of fussiness in a child.
PE 5.8	Discuss the etiology, clinical features and management of enuresis.
5.8.1	Define primary and secondary enuresis for boys and girls.
5.8.2	Discuss etiology of primary and secondary enuresis.
5.8.3	Discuss pharmacological and non-pharmacological management strategies for enuresis.
PE 5.9	Discuss the etiology, clinical features and management of Encopresis.
5.9.1	Describe Encopresis.
5.9.2	Discuss causes of Encopresis.
5.9.3	Describe management of Encopresis.
PE 5.10	Discuss the role of child guidance clinic in children With behavioural problems and the referral criteria
5.10.1	Describe the role of a child guidance clinic in children with behavioural problems.
5.10.2	Enumerate referral criteria for behavioural problems in children.
	Topic: Adolescent Health & common problems related to Adolescent Health
PE6.1	Define Adolescence and stages of adolescence
6.1.1	Define adolescence.
6.1.2	Enumerate the stages of adolescence.
PE 6.2.	Describe the physical, physiological and psychological changes during adolescence(Puberty)

6.2.1	Describe the physical changes during adolescence.
6.2.2	Describe the physiological changes during adolescence.
6.2.3	Describe the psychological changes during adolescence.
PE6.3	Discuss the general health problems during Adolescence
6.3.1	Enumerate the general health problems of adolescence
6.3.2	Describe the general health problems of adolescence
PE6.4	Describe adolescent sexuality and common problems Related to it
6.4.1	Describe adolescent sexuality.
6.4.2	Enumerate common problems related to adolescent sexuality.
PE6.5	Explain the Adolescent Nutrition and common nutritional problem
6.5.1	Describe the nutritional requirements of adolescents.
6.5.2	Discuss the nutritional problems in adolescents.
PE6.6	Discuss the common Adolescent eating disorders(Anorexia nervosa,Bulimia)
6.6	Describe the common adolescent eating problems like Anorexia nervosa and Bulimia nervosa.
PE6.7	Describe the common mental health problems during Adolescence
6.7.1	Describe the common mental health problems during adolescence.
PE6.10	Discuss the objectives and functions of AFHS(Adolescent Friendly Health Services)and the referral Criteria
6.10.1	Discuss the objectives of adolescent friendly health services(AFHS).
6.10.2	Enumerate the functions of adolescent friendly health services(AFHS).
PE6.12	Enumerate the importance of obesity and other NCD In adolescents
6.12.1	Define obesity in adolescence and Enumerate the complications.
6.12.2	Analyze the importance of non-communicable diseases in adolescence.
PE6.13	Enumerate the prevalence and the importance of recognition of sexual drug abuse in adolescents and Children
6.13.1	State the prevalence of sexual and drug abuse among adolescents and children.
6.13.2	Discuss the importance of recognition of sexual and drug abuse in adolescents and children.
	Obesity in children
P E11.1	Describe the common etiology, clinical features and management of obesity n children
11.1.1	Define Obesity and overweight as per WHO guidelines.

11.1.2	Enumerate common causes of Obesity among children.
11.1.3	Describe clinical features of obesity including co-morbidities.
11.1.3	Outline principles of management of Obesity in children.
PE 11.2	Discuss the risk approach for obesity and Discuss the prevention strategies
11.2.1	Enumerate risk factors for Obesity among children.
11.2.2	Describe strategies for prevention of Obesity.
	Micronutrients in Health and disease-1(Vitamins ADEK, B Complex and C)
PE 12.1	Discuss the RDA, dietary sources of Vitamin A and their role in health and disease
12.1.1	Recall the RDA and dietary sources of vitamin A for children of different ages.
12.1.2	Describe the physiology and role of vitamin A in health and disease.
PE 12.2	Describe the causes, clinical features, diagnosis and management of Deficiency/excess of Vitamin A
12.2.1	Enumerate the causes of Vitamin A deficiency/excess in children.
12.2.2	Describe the clinical features of Vitamin A Deficiency/excess in children.
12.2.3	Describe the diagnosis and management of Vitamin A Deficiency/excess in children.
PE 12.5	Discuss the Vitamin A prophylaxis program and their Recommendations
12.5.1	Enumerate the components of the National vitamin A prophylaxis program.
PE 12.6	Discuss the RDA, dietary sources of Vitamin D and its Role in health and disease
12.6.1	Describe the RDA and dietary sources of vitamin D for the pediatric age groups.
12.6.2	Describe the role of vitamin D in health and disease.
PE 12.7 Rickets	Describe the causes, clinical features, diagnosis and management of vitamin D deficiency (VDD)/ excess(Rickets & Hypervitaminosis D)
12.7.1	List the causes of Rickets/Hypervitaminosis D in children.
12.7.2	Describe the clinical features and Describe the underlying pathophysiology of Rickets/Hypervitaminosis D.
12.7.3	Describe the diagnosis and management of Rickets /Hypervitaminosis D.
PE 12.11	Discuss the RDA, dietary sources of Vitamin E and its Role in health and disease
12.11.1	Describe the RDA and dietary sources of vitamin E for the pediatric age.
12.11.2	Describe the role of vitamin E in health and disease.
PE12.12	Describe the causes, clinical features, diagnosis and management of deficiency of Vitamin E
12.12.1	List the causes of deficiency of Vitamin E in children.

12.12.2	Describe the clinical features of deficiency of Vitamin E.
12.12.3	Describe the diagnosis and management of deficiency of Vitamin E.
PE 12.13	Discuss the RDA, dietary sources of Vitamin K and their role in health and disease
12.13.1	Describe the RDA and dietary sources of vitamin K for the pediatric age.
12.13.2	Describe the role of vitamin K in health and disease.
PE 12.14	Describe the causes, clinical features, diagnosis management & prevention of deficiency of Vitamin K
12.14.1	List the causes of deficiency of Vitamin K in children of different ages.
12.14.2	List the clinical features of deficiency of Vitamin K.
12.14.3	Describe the diagnosis and management of deficiency of Vitamin K.
PE 12.15	Discuss the RDA, dietary sources of Vitamin B and its Role in health and disease
12.15.1	Describe the RDA and dietary sources of various vitamins B for the pediatric age group.
12.15.2	Describe the role of vitamin in health and disease.
PE 12.16	Describe the causes, clinical features, diagnosis and management of deficiency of B complex vitamins
12.16.1	List the causes of deficiency of B complex vitamins in children
12.16.2	Describe the clinical features of deficiency of B-complex vitamins
12.16.3	Describe the diagnosis and management of deficiency of B-complex vitamins
PE 12.19	Discuss the RDA, dietary sources of vitamin and Their role in health and disease
12.19.1	List the RDA and dietary sources of vitamin C for the pediatric age
12.19.2	Describe the role of vitamin in health and disease
PE 12.20	Describe the causes, clinical features, diagnosis and management of deficiency of vitamin C(scurvy)
12.20.1	List the causes of deficiency of Vitamin C in children
12.20.2	Describe the clinical features of deficiency of vitamin C
12.20.3	Describe the diagnosis and management of deficiency of vitamin C
PE 13.1	Discuss the RDA, dietary sources of Iron and their role in health and disease
13.1.1	Recall the RDA of Iron in children of all age groups.
13.1.2	Enumerate the dietary sources of Iron and Discuss their role in health and disease.

PE 13.2	Describe the causes, diagnosis and management of Iron deficiency
13.2.1	Enumerate the causes of iron deficiency.
13.2.2	Describe the diagnosis of iron deficiency.
13.2.3	Describe management of iron deficiency.
PE 13.6	Discuss the National anemia control program and its Recommendations
13.6.1	Describe the components of National anemia control program and its recommendations.
PE 13.7	Discuss the RDA, dietary sources of Iodine and its role in Health and disease
13.7.1	Recall the RDA of Iodine in children.
13.7.2	Enumerate the dietary sources of Iodine and their role in Health and disease.
PE 13.8	Describe the causes, diagnosis and management of deficiency of Iodine
13.8.1	Enumerate the causes of Iodine deficiency.
13.8.2	Discuss the diagnosis of Iodine deficiency.
13.8.3	Describe the management of Iodine deficiency.
PE 13.9	Identify the clinical features of Iodine deficiency disorders
13.9.1	Identify the clinical features of Iodine deficiency disorders.
PE 13.10	Discuss the National Goiter Control program and its recommendations
13.10.1	Discuss the National Goiter Control program and the Recommendations.
PE 13.11	Discuss the RDA, dietary sources of Calcium and its role in health and disease
13.11.1	Recall the RDA of Calcium in children.
13.11.2	Enumerate the dietary sources of calcium.
13.11.3	Explain the role of calcium in health and disease.
PE 13.12	Describe the causes, clinical features, diagnosis and management of Calcium Deficiency
13.12.1	Enumerate the causes of Calcium Deficiency.
13.12.2	Describe the clinical features of Calcium Deficiency.
13.12.3	Discuss the diagnosis of Calcium Deficiency.
13.12.4	Discuss the management of Calcium Deficiency.
PE 13.13	Discuss the RDA, dietary sources of Magnesium and their role in health and disease

13.13.1	Recall the RDA of Magnesium in children.
13.13.2	List the dietary sources of Magnesium and their role in health and disease.
PE 13.14	Describe the causes, clinical features, diagnosis and management of Magnesium Deficiency
13.14.1	Enumerate the causes of Magnesium Deficiency.
13.14.2	Describe the clinical features of Magnesium Deficiency.
13.14.3	Discuss the diagnosis of Magnesium Deficiency.
13.14.4	Discuss the management of Magnesium Deficiency.
	Integrated Management of Neonatal and Childhood Illnesses(IMNCI)Guideline
PE16.1	Explain the components of Integrated Management of Neonatal and Childhood Illnesses (IMNCI) guidelines and method of Risk stratification
16.1.1	State the components of IMNCI approach.
16.1.2	Explain the risk stratification as per IMNCI.
PE16.2	Assess children<2monthsusingIMNCIguidelines
16.2.1	Demonstrate assessment of the young infant <2months age as per IMNCI guidelines.
16.2.2	Classify the young infants<2 months age as per the IMNCI classification.
16.2.3	Identify the treatment in young infants<2monthsasperIMNCI.
16.2.4	Counsel parents as per IMNCI guidelines.
PE16.3	Assess children>2months to 5years using IMNCI guidelines and stratify risk
16.3.1	Demonstrate assessment of the child>2monthsto5yearsasperIMNCIformat.
16.3.2	Classify the children>2monthsto5yearsaspertheIMNCIclassification.
16.3.3	Identifythetreatmentinchildren>2monthsto5yearsasperIMNCIguidelines.
16.3.4	Counsel parents as per IMNCI guidelines.
	The National Health programs
PE17.1	State the vision and outline the goals, strategies and plan of action of NHM and other important national programs pertaining to maternal and child health including RMNCHA+, RBSK, RKSK, JSSK, mission Indra Dhanush and ICDS
17.1.1	List the national health programs pertaining to maternal and child health.
17.1.2	Outline vision, goals, strategies and plan of action of NHM.
17.1.3	Outline the vision, goals, strategies and plan of action of other important national programs for maternal and child health –RMNCHA+, RBSK, RKSK, JSSK, mission Indra Dhanush and ICDS.
PE17.2	Analyze the outcomes and appraise the monitoring and evaluation of NHM

17.2.1	Critically analyze the impact of NHM and other national health programs on maternal and child health.
17.2.2	Appraise the monitoring and evaluation of NHM and other health programs.
PE18.1	List and explain the components, plan, outcome of Reproductive Child Health (RCH) program and appraise its monitoring and evaluation
18.1.1	State the components, strategy and targeted outcome of RCH program.
18.1.2	List the pre requisites and role of accredited social health activist (ASHA).
18.1.3	Analyze the monitoring and evaluation of RCH program.
PE 18.2	Explain preventive interventions for child survival and safe motherhood
18.2.1	List the preventive interventions for child survival and safe motherhood.
18.2.2	Explain the preventive interventions for child survival and safe motherhood.
	National Programs, RCH- Universal Immunization program
PE 19.1	Explain the components of the Universal Immunization Program (UIP) and the National Immunization Program (NIP)
19.1.1	Explain the components of UIP and NIP.
19.1.2	List the vaccines covered under UIP and NIP.
PE 19.2	Explain the epidemiology of vaccine preventable diseases (VPDs)
19.2.1	Describe the epidemiology of individual VPDs.
PE 19.3	Vaccine description with regard to classification of vaccines, strain used, dose, route, schedule, risks, benefits and side effects, indications and contraindications
19.3.1	Classify vaccines according to type of vaccine.
19.3.2	Describe the composition of the NIP vaccines including the strain used.
19.3.3	State the dose, route and schedule of all vaccines under NIP.
19.3.4	Recall the risks, benefits, side effects, indications and contraindications of vaccines under NIP.
PE 19.4	Define cold chain and discuss the methods of safe storage and handling of vaccines
19.4.1	Define cold chain and discuss its importance for vaccines.
19.4.2	List the various cold chain equipment.
19.4.3	Describe the appropriate storage of vaccines in domestic refrigerator, ice lined refrigerator (ILR) and vaccine carriers.
19.4.4	Enumerate the precautions for maintaining vaccines at appropriate temperature including the use of vaccine vial monitor (VVM).
19.4.5	Explain the method of cold chain maintenance during a vaccine session.
PE 19.5	Discuss immunization in special situations – HIV positive children, immunodeficiency, pre-term, organ transplants, those who received blood and blood products, splenectomised children, adolescents, and travelers

19.5.1	Explain immunization in special situations – HIV positive children, immunodeficiency, pre-term, organ transplants, those who received blood and blood products, splenectomised children, adolescents, travelers.
PE 19.8	Demonstrate willingness to participate in the national and subnational immunization days
19.8.1	Participate in the national (NIDs) and subnational immunization days (SNIDs).
PE 19.9	Describe the components of safe vaccine practice – Patient education/ counselling; adverse events following immunization, safe injection practices, documentation and medico-legal implications
19.9.1	Describe the components of safe vaccine practices – patient education/counseling.
19.9.2	Describe adverse events following immunization and standard precautions to prevent them.
19.9.3	List safe injection practices and documentation during immunization.
19.9.4	Demonstrate necessary documentation and medicolegal implications of immunization.
PE 19.16	Enumerate available newer vaccines and their indications including pentavalent pneumococcal, rotavirus, JE, typhoid IPV & HPV
19.16.1	Enumerate newer vaccines (pneumococcal, rotavirus, JE typhoid, IPV, influenza & HPV vaccines).
19.16.2	List the indications for newer vaccines such as pneumococcal, JE, typhoid, influenza & HPV vaccines
	Care of the Normal Newborn and High risk Newborn
PE 20.11	Discuss the clinical characteristics, complications and management of low birth weight (preterm and small for gestation).
20.11.1	Describe the clinical characteristics of preterm, small for gestation and low birth weight newborns.
20.11.2	Enumerate the complications in the preterm, small for gestation and low birth weight newborns
20.11.3	Describe the management of the preterm, small for date and low birth weight newborns.
20.11.4	Enumerate the criteria for discharge of low birth weight babies from hospital-based care.
20.11.5	List the follow up advice for low birth weight newborns.
PE 20.12	Discuss the temperature regulation in neonates, clinical features and management of Neonatal Hypothermia.
20.12.1	Enumerate the modes of heat loss in a newborn.
20.12.2	Describe the mechanism of thermoregulation in the newborn.
20.12.3	Classify hypothermia in newborns as per NNF criteria.
20.12.4	Describe the clinical features of a newborn with cold stress, moderate hypothermia and severe hypothermia.
20.12.5	Discuss the management of cold stress, moderate hypothermia and severe hypothermia.
20.12.6	Outline the prevention of hypothermia in newborn by 'ten steps of the warm chain'.
20.12.7	Explain the Kangaroo Mother Care for prevention of hypothermia in newborns.
PE 20.13	Discuss the etiology, clinical features and management of Neonatal hypoglycemia.

20.13.1	Define hypoglycemia in newborn.
20.13.2	Enumerate the etiology of hypoglycemia in the newborn.
20.13.3	Enumerate the “at risk newborns” needing routine blood sugar monitoring for hypoglycemia.
20.13.4	Describe the clinical features of hypoglycemia in the newborn.
20.13.5	Discuss the management of a newborn with asymptomatic and symptomatic hypoglycemia.
20.13.6	Enumerate the measures for prevention of hypoglycemia in newborn.
PE 20.14	Discuss the etiology, clinical features and management of Neonatal hypocalcemia.
20.14.1	Define neonatal hypocalcemia.
20.14.2	Enumerate the risk factors for early and late onset hypocalcemia.
20.14.3	Describe the clinical features of neonatal hypocalcemia.
20.14.4	Outline the management of neonatal hypocalcemia.
PE 20.18	Identify and stratify risk in a sick neonate using IMNCI guidelines
20.18.1	Identify possible serious bacterial infection/jaundice and stratify the sick neonate as per IMNCI.
20.18.2	Identify and stratify dehydration in a sick neonate with diarrhea as per IMNCI.
20.18.3	Classify diarrhea into severe persistent diarrhea and severe dysentery as per IMNCI guidelines.
20.18.4	Check for feeding problem and malnutrition and stratify.
20.18.5	Assess breastfeeding and check for signs of good attachment to the breast in a neonate.
20.18.6	Interpret and classify the neonate on the basis of weight for age z scores weight categories accurately.
	Acute and chronic liver disorders
PE 26.1	Discuss the etiopathogenesis, clinical features and management of acute hepatitis in children
26.1.1	Define Acute Hepatitis in children.
26.1.2	Enumerate common causes of Acute Hepatitis in children.
26.1.3	Describe pathogenesis of Acute Hepatitis in children.
26.1.4	Describe the clinical features and complications of Acute Hepatitis.
26.1.5	List the investigations required for diagnosis of Acute Hepatitis.
26.1.6	Describe the management and prevention of Acute Hepatitis.
PE 26.2	Discuss the etiopathogenesis, clinical features and management of Fulminant Hepatic Failure in children
26.2.1	Define Fulminant Hepatic Failure in Children.
26.2.2	Enumerate the factors which precipitate Fulminant Hepatic Failure.

26.2.3	Describe the pathogenesis of Fulminant Hepatic Failure.
26.2.4	Describe the clinical features of Fulminant Hepatic Failure.
26.2.5	Enumerate the investigations for a child with Fulminant Hepatic Failure.
26.2.6	Describe the management of Fulminant Hepatic Failure.
PE 26.3	Discuss the etiopathogenesis, clinical features and management of chronic liver diseases in children.
26.3.1	Define Chronic Liver Disease in children.
26.3.2	Enumerate the causes of chronic liver diseases in children.
26.3.3	Discuss the pathogenesis of common chronic Liver Diseases.
26.3.4	Describe the clinical features of chronic liver disease.
26.3.5	Enumerate the investigations for diagnosis of Chronic Liver Disease.
26.3.6	Describe the management of Chronic liver disease.
PE 26.4	Discuss the etiopathogenesis, clinical features and management of Portal Hypertension in children
26.4.1	Define Portal Hypertension in children.
26.4.2	Classify different types of portal hypertension.
26.4.3	Enumerate the causes of portal hypertension.
26.4.4	Explain the pathogenesis of portal hypertension.
26.4.5	Describe the clinical features of portal hypertension.
26.4.6	Outline the management of portal hypertension.
PE 26.12	Discuss the prevention of Hep B infection – Universal precautions and Immunization
26.12.1	Enumerate different preventive measures against hepatitis B virus infection.
26.12.2	List universal precautions.
26.12.3	Describe the immunization schedule of Hepatitis B.
	Topic: Respiratory system
PE 28.1	Discuss the etiopathogenesis, clinical features and management of Nasopharyngitis
28.1.1	Enumerate the etiological factors for Nasopharyngitis.
28.1.2	Describe the clinical features of Nasopharyngitis
28.1.3	Outline the management of Nasopharyngitis
PE 28.2	Discuss the etiopathogenesis of Pharyngotonsillitis
28.2.1	Enumerate the etiological factors causing Pharyngo-tonsillitis.

PE 28.3	Discuss the clinical features and management of Pharyngotonsillitis
28.3.1	Describe the clinical features of Pharyngotonsillitis.
28.3.2	Outline the management of acute Pharyngo-tonsillitis.
PE28.4	Discuss the etiopathogenesis, clinical features and management of Acute Otitis Media (AOM)
28.4.1	List the common etiological agent causing Acute Otitis Media (AOM)
28.4.2	Discuss the pathogenesis of Acute Otitis Media (AOM),
28.4.3	Enumerate the clinical features of Acute Otitis Media (AOM), recurrent AOM and OM with effusion
28.4.4	Outline the management of Acute Otitis Media (AOM), recurrent AOM and OM with effusion
PE28.5	Discuss the etiopathogenesis, clinical features and management of Epiglottitis
28.5.1	Describe the etiopathogenesis of Epiglottitis
28.5.2	Enumerate the clinical features of Epiglottitis
28.5.3	Outline the management of Epiglottitis including acute care
PE28.6	Discuss the etiopathogenesis, clinical features and management of Acute laryngotracheobronchitis
28.6.1	Describe the etiopathogenesis of Acute laryngo-tracheo-bronchitis (croup)
28.6.2	Describe the clinical features of Acute laryngo-tracheo-bronchitis
28.6.3	Outline the management of Acute laryngo-tracheo-bronchitis.
PE 28.7	Discuss the etiology, clinical features and management of Stridor in children
28.7.1	Enumerate the etiology of stridor in children
28.7.2	Describe the clinical features of stridor in children
28.7.3	Discuss the differential diagnosis of stridor
28.7.4	Outline the management of stridor.
PE 28.8	Discuss the types, clinical presentation, and management of foreign body aspiration in infants and Children
28.8.1	List the objects commonly aspirated by children
28.8.2	Enumerate the clinical features of FB aspiration
28.8.3	Describe 'Heimlich maneuver' for a child and '5 back slaps and 5 chest thrust' for an infant
28.8.5	Outline the management of FB aspiration
PE 28.15	Stratify risk in children with stridor using IMNCI guidelines
28.15.1	Classify the child with stridor as per IMNCI guidelines

PE 28.16	Interpret blood tests relevant to upper respiratory Problems
28.16.1	Plan and interpret the relevant blood test in a patient with upper respiratory problems
PE 28.17	Interpret X-ray of the paranasal sinuses and mastoid; and /or use, written report in case of management. Interpret CXR in foreign body aspiration and lower respiratory tract infection, understand the significance of thymic shadow in pediatric chest X-rays
28.17.1	Interpret the X-ray of paranasal sinuses and mastoid for various common diseases
28.17.2	Interpret the chest X-ray for identifying suspected FB aspiration and lower respiratory tract infection
28.17.3	Identify thymic shadow in chest X-ray.
28.17.4	Plan the treatment after interpreting X-ray and/or its written report.
PE 28.18	Describe the etiopathogenesis, diagnosis, clinical features, management and prevention of lower respiratory infections including bronchiolitis, wheeze associated LRTI Pneumonia and empyema
28.18.1	Enumerate the common organisms causing LRTI
28.18.2	Discuss the pathogenesis of LRTI including bronchiolitis, WALRI, pneumonia and empyema.
28.18.3	Describe the clinical features of LRTI including bronchiolitis, WALRI, pneumonia and empyema
28.18.4	Discuss the diagnosis of LRTI including bronchiolitis, WALRI, pneumonia and empyema after taking relevant clinical history and examination.
28.18.5	Describe relevant investigations in a child with LRI
28.18.6	Discuss the treatment of LRTI including bronchiolitis, WALRI, pneumonia and empyema
28.18.7	Discuss the preventive strategies for LRTI
PE 28.19	Describe the etiopathogenesis, diagnosis, clinical features, management and prevention of asthma in children
28.19.1	Define Asthma in children as per ATM guidelines.
28.19.2	Discuss the pathophysiology of asthma in children.
28.19.3	Describe the clinical features of asthma
28.19.4	Discuss the diagnosis of asthma based on relevant clinical history, family history and physical examination.
28.19.5	Enumerate the investigations in a child with Asthma
28.19.6	List the drugs used for treating asthma in children
28.19.7	Describe the treatment of acute attack of asthma
28.19.8	Describe the step wise approach of preventer therapy for asthma as per ATM/GINA guidelines
28.19.9	Describe various drug delivery devices for asthma
28.19.10	Enumerate asthma triggers
PE 28.20	Counsel the child with asthma on the correct use of inhalers in a simulated

	environment
28.20.1	Counsel the child and the caretaker for correct use of MDI and spacer at initiation of therapy and on follow up
	Anemia and other Hemato-oncologic disorders in children
PE 29.1	Discuss the etiopathogenesis, clinical features, classification and approach to a child with anemia
29.1.1	Define anemia as per WHO GUIDELINES
29.1.2	Enumerate the causes of anemia.
29.1.3	Describe the pathogenesis of anemia.
29.1.4	Enumerate clinical features of anemia
29.1.5	Classify Anemia according to red cell morphology
29.1.6	Describe the approach to a child with Anemia.
29.1.7	List the investigations in child with anemia.
PE 29.2	Discuss the etiopathogenesis, clinical features and management of iron deficiency anemia.
29.2.1	Enumerate the causes of iron deficiency anemia in children
29.2.2	Describe the pathogenesis of iron deficiency anemia.
29.2.3	Describe clinical features of iron deficiency anemia in children.
29.2.4	List the investigations in a child with iron deficiency.
29.2.5	Describe the treatment of iron deficiency anemia in children.
PE 29.5	Discuss the National Anemia Control Program.
29.5.1	Describe National Anemia Control Program.
PE 29.6	Discuss the cause of thrombocytopenia in children: describe the clinical features and management of idiopathic Thrombocytopenic Purpura.
29.6.1	Define thrombocytopenia
29.6.2	Enumerate the causes of thrombocytopenia in children.
29.6.3	Describe the pathogenesis of ITP.
29.6.4	Describe the clinical features of ITP.
29.6.5	Outline the investigations of ITP
29.6.6	Outline the management of ITP.
PE 29.7	Discuss the etiology, classification, pathogenesis and clinical features of Hemophilia in children.
29.7.1	Describe the etiology of hemophilia.
29.7.2	Classify hemophilia.

29.7.3	Describe the pathogenesis of hemophilia.
29.7.4	Enumerate the clinical features of hemophilia.
PE 29.8	Discuss the etiology, clinical presentation and management of Acute Lymphoblastic Leukemia in Children.
29.8.1	State the etiologies of Acute Lymphoblastic Leukemia (ALL).
29.8.2	Enumerate risk factors for childhood leukemia.
29.8.3	Describe the clinical presentation of ALL.
29.8.4	Outline the investigations for diagnosis of ALL.
29.8.5	Outline the treatment for ALL.
PE 29.9	Discuss the etiology, clinical presentation and management of Lymphoma in children.
29.9.1	Define lymphoma.
29.9.2	State the etiology of Lymphoma and its types.
29.9.3	Describe the pathology of lymphomas.
29.9.4	Recall the clinical features of Lymphomas.
29.9.5	Outline the investigations (diagnostic work up) for Lymphomas.
29.9.6	Enumerate the treatment modalities for Lymphomas.
PE 29.14	Interpret CBC, LFT
29.14.1	interpret Complete Blood Count Report
29.14.2	Interpret Liver Function Tests Report.
PE 29.15	Perform and Interpret peripheral smear.
29.15.1	Prepare a peripheral blood film.
29.15.2	Interpret the peripheral blood film.
29.15.3	Make diagnosis of peripheral blood film.
PE 29.16	Discuss the indications for Hemoglobin electrophoresis and interpret the report.
29.16.1	Enumerate the indications for Hemoglobin electrophoresis
29.16.2	interpret the report of Hemoglobin electrophoresis
PE 29.19	Counsel and educate patients about prevention and treatment of anemia.
29.19.1	Counsel the parents empathetically about the diet and preventive measures for anemia.
29.19.2	Educate the patients/parents about the correct usage of drugs.
PE 29.20	Enumerate the indications for splenectomy and precautions

29.20.1	Enumerate the indications for splenectomy
29.20.2	Explain about the immunization and antibiotic prophylaxis
	Allergic Rhinitis, Atopic Dermatitis, Bronchial Asthma, Urticaria Angioedema
PE 31.1	Describe the etiopathogenesis, management and prevention of Allergic Rhinitis in Children
31.1.1	Define allergic rhinitis in children
31.1.2	Enumerate risk factors and describe pathogenesis for allergic rhinitis in children
31.1.3	Describe treatment and prevention for allergic rhinitis in children
PE 31.3	Describe the etiopathogenesis, clinical features and management of Atopic dermatitis in Children
31.3.1	Describe etiopathogenesis of atopic dermatitis in children.
31.3.2	Describe clinical features of atopic dermatitis in children.
31.3.3	Describe treatment for prevention and control of atopic dermatitis in children
PE 31.12	Discuss the etiopathogenesis, clinical features, complications and management of Urticaria Angioedema.
31.12.1	Describe etiopathogenesis of urticaria/ angioedema in children
31.12.2	Describe clinical features of urticaria/ angioedema
31.12.3	Enumerate common complications of urticaria/ angioedema in children
31.12.4	Enumerate investigations in case of urticaria/ angioedema in children
31.12.5	Describe treatment plan of urticaria/ angioedema in children
	Endocrinology
PE 33.1	Describe the etiopathogenesis clinical features, management of Hypothyroidism in children
33.1.1	Describe the pathogenesis of hypothyroidism in children
33.1.2	Enumerate the causes of congenital and acquired hypothyroidism in children.
33.1.4	Describe the clinical features of congenital and acquired hypothyroidism
33.1.5	Discuss the approach to a case of congenital / acquired hypothyroidism in children
33.1.6	Outline the treatment of hypothyroidism in children.
PE 33.2	Recognize the clinical signs of Hypothyroidism and refer
33.2.1	Recognize hypothyroidism by taking appropriate history and focused physical examination
33.2.2	Identify the need to refer the child to higher center
PE 33.3	Interpret and explain neonatal thyroid screening report
33.3.1	Interpret the given neonatal thyroid screening report

33.3.2	Explain the given thyroid screening report
PE 33.4	Discuss the etiopathogenesis, clinical types, presentations, complication and management of Diabetes mellitus in children
33.4.1	Explain the etiopathogenesis of Diabetes mellitus in children.
33.4.2	Discuss clinical types of DM in children.
33.4.4	Describe the clinical features of DM in children.
33.4.5	Enumerate the complications of DM.
33.4.6	Describe the comprehensive management for children with DM.
PE33.5	Interpret Blood sugar reports and explain the diagnostic criteria for Type 1 Diabetes
33.5.1	Identify Type 1 Diabetes from a given blood report as per latest diagnostic criteria of DM (American Diabetes Association, 2016)
PE 33.8	Define precocious and delayed Puberty
33.8.1	Discuss normal Physiology of puberty and define precocious and delayed puberty
	The role of the physician in the community
PE 35.1	Identify, discuss and defend medicolegal, socio-cultural and ethical issues as they pertain to health care in children (including parental rights and right to refuse treatment)
35.1.1	List common medicolegal issues related to healthcare in children
35.1.2	List common socio-cultural issues related to healthcare in children
35.1.3	Identify the important socio-cultural and ethical issues related to healthcare in children in a clinical case during bedside teaching
35.1.4	Discuss the common medico-legal, socio-cultural and ethical issues related to healthcare in children

MBBS PHASE 3 PART 2

:Fluid and electrolyte balance

PE 15.1	Discuss the fluid and electrolyte requirement in health and disease
15.1.1	State the fluid requirement of a healthy neonate.
15.1.2	Describe the fluid and electrolyte requirements of healthy children of different ages.

15.1.3	Describe the fluid requirements in common diseases of children.
PE 15.2	Discuss the clinical features and complications of fluid and electrolyte imbalance and outline the management
15.2.1	Define hyponatremia and hypernatremia.
15.2.2	Define hypokalemia and hyperkalemia.
15.2.3	Describe the clinical features of a child who has dehydration or fluid overload.
15.2.4	Outline the management of a child who has dehydration or fluid overload.
15.2.5	Enumerate the symptoms and signs of hyponatremia and Hypernatremia.
15.2.6	Enumerate the symptoms and signs of hypokalemia and hyperkalemia.
15.2.7	Outline the management of a child with hyponatremia /hypernatremia.
15.2.8	Outline the management of a child with hypokalemia or Hyperkalemia.
PE 20.7	Discuss the etiology, clinical features and management of Birth asphyxia
20.7.1	Define birth asphyxia as per NNF (National Neonatology Forum) and WHO, AAP guidelines.
20.7.2	Enumerate the etiology of birth asphyxia based on antenatal, natal and postnatal factors.
20.7.3	Describe the clinical features of birth asphyxia.
20.7.4	List the complications of hypoxic ischemic encephalopathy.
20.7.5	Describe the post resuscitation management of the asphyxiated neonate.
PE 20.8	Discuss the etiology, clinical features and management of respiratory distress in Newborn including meconium aspiration and transient tachypnea of newborn.
20.8.1	Define Respiratory Distress in a neonate (as per NNF guidelines).
20.8.2	Enumerate the common etiologies of respiratory distress based on time of onset and gestation.
20.8.3	Enumerate the parameters of the Downes score for assessment of severity of respiratory distress.
20.8.4	Describe the clinical features and complications of Meconium Aspiration Syndrome (MAS).
20.8.5	Discuss the management of MAS.
20.8.6	Discuss the clinical features and management of Transient Tachypnea of Newborn.
20.8.7	Describe the etiology and clinical features of Hyaline Membrane Disease.
20.8.8	Discuss the management including prevention of HMD.
PE 20.9	Discuss the etiology, clinical features and management of birth injuries.
20.9.1	Define birth injury (as per National Vital Statistics Report).
20.9.2	Enumerate the common birth injuries in neonates

20.9.3	Discuss the etiology and risk factors of birth injuries
20.9.4	Discuss the clinical features of common birth injuries like, cephalhematoma, subgaleal hemorrhage, brachial plexus and facial nerve injury, bone and soft tissue injuries and intra-abdominal injuries, fractures.
20.9.5	Discuss the management including prevention of common birth injuries
PE 20.10	Discuss the etiology, clinical features and management of hemorrhagic disease of newborn
20.10.1	Enumerate the causes of hemorrhagic disease of newborn according to time of onset.
20.10.2	Discuss the role of vitamin K deficiency in hemorrhagic disease of newborn.
20.10.3	Describe the clinical features of early, classical and late onset hemorrhagic disease of newborn.
20.10.4	Outline the steps of management and prevention of hemorrhagic disease of newborn.
PE 20.15	Discuss the etiology, clinical features and management of neonatal seizures.
20.15.1	Enumerate the clinical types of seizures in the newborn.
20.15.2	Enumerate the key differentiating features between seizures and jitteriness.
20.15.3	Describe the common causes of neonatal seizures according to time of onset of seizure.
20.15.4	Discuss the clinical features of the common causes of neonatal seizures.
20.15.5	List the primary diagnostic tests indicated in neonatal seizures.
20.15.6	Elaborate the step wise algorithmic approach for the management of neonatal seizures.
PE 20.16	Discuss the etiology, clinical features and management of neonatal sepsis.
20.16.1	Define neonatal sepsis, probable sepsis, severe sepsis, septic shock
20.16.2	Classify Early and late neonatal sepsis.
20.16.3	Enumerate the organisms responsible for causing early and late onset sepsis.
20.16.4	Enumerate the risk factors of early and late onset neonatal sepsis correctly.
20.16.5	Describe the clinical features of early onset and late onset neonatal sepsis
20.16.6	Enumerate the commonly used laboratory tests for diagnosis of neonatal sepsis.
20.16.7	Recall the interpretation of a positive sepsis screen.
20.16.8	Describe the approach to a newborn with suspected early onset sepsis.
20.16.9	Describe the approach to a newborn with suspected late onset sepsis.
20.16.8	List the commonly used antibiotics (with dosage and duration of therapy) in the management of neonatal sepsis.
20.16.9	Describe the supportive and adjunctive therapy in management of neonatal sepsis.
20.16.9	Discuss the measures for prevention of early onset and late onset sepsis.

PE 20.17	Discuss the etiology, clinical features and management of Perinatal infections.
20.17.1	Define Perinatal infection.
20.17.2	Discuss the etiology and risk factors for acquisition of common Perinatal infections like Herpes, Cytomegalovirus, Toxoplasmosis, Rubella, HIV, Varicella, Hepatitis B virus and syphilis.
20.17.3	Describe the clinical features of the common Perinatal infections.
20.17.4	Outline the management of the common Perinatal infections.
20.17.5	Enumerate the measures for prevention of common Perinatal infections.
PE 20.19	Discuss the etiology, clinical features and management of Neonatal hyperbilirubinemia.
20.19.1	Describe the etiology of neonatal hyperbilirubinemia
20.19.2	Differentiate the causes of neonatal jaundice based on age of onset and duration of jaundice.
20.19.3	Enumerate the common causes of unconjugated and conjugated hyperbilirubinemia in the newborn.
20.19.4	Differentiate between physiological and pathological jaundice in the newborn.
20.19.5	Discuss the clinical features of common causes of neonatal jaundice
20.19.6	Describe the important clinical features of acute bilirubin encephalopathy.
20.19.7	List the investigations to be performed in the evaluation of neonatal hyperbilirubinemia.
20.19.8	Categorize the risk in neonatal hyperbilirubinemia based on the American Academy of Pediatrics Bilirubin Nomogram.
20.19.9	Identify a neonate requiring phototherapy as per the American Academy of Pediatrics Bilirubin Nomogram.
20.19.10	Identify a neonate requiring exchange transfusion as per the American Academy of Pediatrics Bilirubin Nomogram correctly.
20.19.11	Describe the care of the baby receiving phototherapy.
20.19.12	Explain the mechanism of phototherapy.
20.19.13	Detail the method of administering phototherapy.
PE 20.20	Identify clinical presentations of common surgical conditions in the newborn including TEF, esophageal atresia, anal atresia, cleft lip and palate, congenital diaphragmatic hernia and causes of acute abdomen.
20.20.1	Describe clinical presentations of common surgical conditions in the newborn like Tracheo-esophageal fistula (TEF), esophageal atresia, anal atresia, cleft lip and palate and congenital diaphragmatic hernia correctly.
20.20.2	Enumerate the causes of acute abdomen in the newborn
20.20.3	Recall the causes of acute abdomen in the newborn based on the presenting clinical features.
	Genito-Urinary system
PE 21.1	Enumerate the etiopathogenesis, clinical features, complications and management of Urinary Tract infection (UTI) in children
21.1.1	Define UTI as per standard criteria.

21.1.2	Enumerate the organisms causing UTI in children of different ages.
21.1.3	Describe the clinical features of simple & complicated UTI.
21.1.4	Outline diagnostic workup for children with UTI at different ages.
21.1.5	Describe the treatment including the choice of antibiotics and duration of antibiotic therapy for treating simple & complicated UTI.
21.1.6	Enumerate the complications of UTI in children.
PE 21.2	Enumerate the etiopathogenesis, clinical features, complications and management of acute post-streptococcal Glomerular Nephritis in children
21.2.1	Define acute glomerulonephritis.
21.2.2	Elaborate pathogenesis of immune mediated nephritic syndrome
21.2.3	Describe the clinical features of Post-Streptococcal Glomerulonephritis (PSGN)
21.2.4	Enumerate the complications of PSGN.
21.2.5	Enumerate the investigations for PSGN.
21.2.6	Enumerate indications of kidney biopsy in PSGN.
21.2.7	Outline management of PSGN.
PE 21.3	Discuss the approach and referral criteria to a child with Proteinuria
21.3.1	List causes of glomerular & non glomerular Proteinuria.
21.3.2	Define nephrotic syndrome.
21.3.3	Enumerate causes of nephrotic syndrome.
21.3.4	Outline the approach to a child with first episode of nephrotic syndrome.
21.3.5	List the complications of nephrotic syndrome.
21.3.6	List indications of kidney biopsy in nephrotic syndrome.
21.3.7	Outline the management of initial episode nephrotic syndrome and subsequent relapse.
21.3.8	List the Criteria for referral of a child with proteinuria.
PE 21.4	Discuss the approach and referral criteria to a child with hematuria
21.4.1	Enumerate causes of hematuria in children of different ages
21.4.2	Outline differences between glomerular & non glomerular hematuria
21.4.3	List investigations for a child with hematuria
21.4.4	List indications of kidney biopsy in hematuria
21.4.5	List criteria for referral for a child with hematuria
PE 21.5	Enumerate the etiopathogenesis, clinical features, complications and management of Acute Renal Failure in children

21.5.1	Define acute kidney injury (AKI) as per KDIGO.
21.5.2	Outline classification of AKI.
21.5.3	Enumerate causes of AKI.
21.5.4	List investigations for AKI in children.
21.5.5	Describe the management of AKI.
21.5.6	List indications of renal replacement therapy in AKI.
21.5.7	Enumerate complications of AKI.
PE 21.6	Enumerate the etiopathogenesis, clinical features, complications and management of chronic kidney disease in children.
21.6.1	Define chronic kidney disease (CKD) & its staging in children.
21.6.2	Outline the clinical features of CKD in children.
21.6.3	List causes of CKD in children.
21.6.4	Enumerate complications of CKD in children.
21.6.5	Outline management of CKD & its complications.
PE 21.7	Enumerate the etiopathogenesis, clinical features, complications and management of Wilms Tumor.
21.7.1	Describe Etiopathogenesis of Wilms tumor.
21.7.2	Describe clinical features of Wilms tumor.
21.7.3	List investigations for a patient with Wilms tumor.
21.7.4	Outline the management of Wilms tumor.
PE 21.15	Discuss and enumerate the referral criteria for children with genitourinary disorder
21.15.1	Enumerate referral criteria in a child with Genitourinary disorder.
PE 21.17	Describe the etiopathogenesis, grading, clinical features and management of hypertension in children
21.17.1	Define Hypertension (HTN) & its staging as per AAP 2017 guidelines.
21.17.2	Enumerate causes of hypertension in children.
21.17.3	Describe the clinical presentation of a child with HT.
21.17.4	List complications of HT in children.
21.17.5	Enumerate investigations for hypertension in children.
21.17.6	Outline treatment of hypertension (as per guidelines) in children.
	Cardio vascular system-Heart Diseases
PE 23.1	Discuss the Hemodynamic changes, clinical presentation, complications and management of acyanotic Heart Diseases -VSD, ASD and PDA

23.1.1	Explain and illustrate diagrammatically the hemodynamic changes seen in acyanotic congenital heart diseases viz VSD, ASD, PDA.
23.1.2	Describe the signs and symptoms, timing of presentation of above acyanotic congenital heart diseases.
23.1.3	Enumerate the complications of acyanotic congenital heart diseases.
23.1.4	Outline the medical management of congenital acyanotic heart disease as above.
23.1.5	Enumerate the surgical treatments for VSA, ASD, PDA.
PE 23.2	Discuss the Hemodynamic changes, clinical presentation, complications and management of Cyanotic Heart Diseases – Fallot Physiology
23.2.1	Enumerate the essential components of Fallot Physiology and List the cardiac conditions with the Fallot Physiology.
23.2.2	Describe and illustrate diagrammatically the hemodynamic changes seen in Fallot Physiology cyanotic congenital heart diseases.
23.2.3	Explain the clinical presentation and complications of Fallot Physiology cyanotic congenital heart diseases.
23.2.5	Describe a cyanotic spell and the pharmacological and non-pharmacological management of cyanotic spells.
23.2.6	Describe the treatment options for lesions with Fallot Physiology.
PE 23.3	Discuss the etiopathogenesis, clinical presentation and management of cardiac failure in infant and children
23.3.1	Enumerate causes of congestive heart failure in children as per the age of presentation.
23.3.2	Describe the hemodynamic changes in congestive heart failure.
23.3.3	Describe the signs and symptoms of left side, right side and combined congestive heart failure.
23.3.4	Enumerate the various management options available for congestive heart failure.
23.3.5	Explain the role of diuretics, inotropes, inodilators, and afterload reducing agents in treatment of CCF.
PE 23.4	Discuss the etiopathogenesis, clinical presentation and management of Acute Rheumatic Fever in children
23.4.1	Explain the etiopathogenesis of Acute rheumatic fever.
23.4.2	Describe the modified Jones criteria to diagnose the Acute rheumatic fever.
23.4.3	Describe laboratory changes in Acute rheumatic fever.
PE 23.5	Discuss the clinical features, complications, diagnosis, management and prevention of Acute Rheumatic Fever
23.5.1	Describe the clinical features of acute rheumatic fever.
23.5.2	List the long-term complications of Acute Rheumatic fever.
23.5.3	Outline the medical management of acute rheumatic fever.
23.5.4	Discuss strategies for the primary and secondary prevention of the acute rheumatic fever.
PE 23.6	Discuss the etiopathogenesis, clinical features and management of Infective endocarditis in children
23.6.1	Enumerate the common predisposing conditions and etiopathogenesis of Infective endocarditis in children.

23.6.2	List criteria used to diagnose Infective endocarditis.
23.6.3	Describe the clinical features of infective endocarditis in children.
23.6.4	Outline the management of infective endocarditis in children.
23.6.5	State the long-term complications of Infective endocarditis.
23.6.6	Enumerate the conditions requiring prophylaxis for infective endocarditis.
	Pediatric Emergencies–Common Pediatric Emergencies
PE 27.1	List the common causes of morbidity and mortality in the under five children
27.1.1	Enumerate the common causes of morbidity and mortality in under five children.
PE 27.2	Describe the etiopathogenesis, clinical approach and management of cardiorespiratory arrest in children
27.2.1	Enumerate the causes of cardiorespiratory arrest in children.
27.2.2	Discuss the pathogenesis of respiratory and cardiac failure leading to cardiorespiratory arrest.
27.2.3	Describe the clinical approach to a child in cardiorespiratory arrest.
27.2.4	Describe the management of a child in cardiorespiratory arrest.
PE 27.3	Describe the etiopathogenesis of respiratory distress in children
27.3.1	Enumerate the causes of respiratory distress in children of different age groups.
27.3.2	Explain the pathogenesis of respiratory distress in children.
PE 27.4	Describe the clinical approach and management of respiratory distress in children
27.4.1	Discuss the clinical approach based on history, examination and investigation algorithm of children of different ages presenting with respiratory distress.
27.4.2	Outline the treatment in children with respiratory distress.
PE 27.5	Describe the etiopathogenesis, clinical approach and management of Shock in children
27.5.1	Define shock including different types of shock.
27.5.2	Enumerate the causes leading to different types of shock viz hypovolemic, septic and cardiogenic shock.
27.5.3	Explain pathogenesis of different types of shock in children.
27.5.4	Describe clinical approach to identify different types of shock.
27.5.4	Outline an algorithm approach to the management of different types of shock in children.
PE 27.6	Describe the etiopathogenesis, clinical approach and management of Status epilepticus
27.6.1	Define Status epilepticus.
27.6.2	Discuss the pathogenesis of status epilepticus in children.
27.6.3	Discuss the underlying diagnosis based on clinical history, examination and investigation algorithm in a child with status epilepticus.

27.6.4	Outline the treatment algorithm as per recent guidelines in a child with status epilepticus.
PE 27.7	Describe the etiopathogenesis, clinical approach and management of an unconscious child
PE 27.7.1	Define different levels of consciousness in children.
27.7.2	Enumerate the causes of altered sensorium/coma in children.
27.7.3	Explain pathogenesis of altered sensorium/coma.
27.7.4	Describe the clinical approach based on clinical history, examination in a child with altered sensorium/coma.
27.7.5	List the investigations as guided by the clinical assessment of the patient.
27.7.4	Outline the treatment plan for a comatose child.
PE 27.8	Discuss the common types, clinical presentations and management of poisoning in children
27.8.1	Enumerate the common poisoning in children.
27.8.1	Elaborate on the clinical sign and symptoms of common poisoning in children (kerosene, organophosphorus, paracetamol and corrosive).
27.8.1	Discuss the management of common poisoning in children (kerosene, organophosphorus, paracetamol and corrosive).
PE 27.9	Discuss oxygen therapy, in Pediatric emergencies and modes of administration
27.9.1	Enumerate the indications of oxygen therapy in pediatric emergencies.
27.9.2	Describe different modalities for oxygen delivery.
	Systemic Pediatrics-Central Nervous system
PE 30.1	Discuss the etiopathogenesis, clinical features, complications, management and prevention of meningitis in children
30.1.1	Enumerate all common causes of meningitis in children.
30.1.2	Describe pathogenesis of meningitis in children.
30.1.3	Describe all the clinical features of meningitis in children.
30.1.4	Enumerate all the complications of meningitis in children.
30.1.6	Enumerate all the investigations to diagnose meningitis in children.
30.1.7	Describe the CSF picture diagnostic of pyogenic meningitis.
30.1.8	Describe the standard treatment of meningitis based on age of patient and organism if identified.
30.1.9	Enumerate various preventive measures for meningitis.
PE 30.2	Distinguish bacterial, viral and tuberculous meningitis
30.2.1	Differentiate the clinical features of bacterial, viral and tubercular meningitis in a child
30.2.2	Differentiate the cerebrospinal fluid (CSF) picture of bacterial, viral and tubercular meningitis in a child

PE 30.3	Discuss the etiopathogenesis, classification, clinical features, complication and management of Hydrocephalus in children
30.3.1	Define hydrocephalus.
30.3.2	Enumerate all causes of hydrocephalus.
30.3.3	Describe normal CSF circulation and pathogenesis of hydrocephalus
30.3.4	Classify types of hydrocephalus
30.3.5	Describe all the clinical features of hydrocephalus.
30.3.6	Enumerate all the complications of hydrocephalus.
30.3.7	Describe the radiological picture (USG, CT scan or MRI) diagnostic of hydrocephalus
30.3.8	Enumerate the investigations required to make an etiological diagnosis of hydrocephalus
30.3.9	Describe the standard treatment for hydrocephalus including medical and surgical modalities.
PE 30.4	Discuss the etiopathogenesis, classification, clinical features, and management of Microcephaly in children
30.4.1	Define microcephaly.
30.4.2	Enumerate all causes of microcephaly in children
30.4.3	Describe pathogenesis of microcephaly in children
30.4.4	Classify types of microcephaly in children
30.4.5	Describe all the clinical features of microcephaly
30.4.6	Describe treatment for microcephaly.
PE 30.5	Enumerate the Neural tube defects. Discuss the causes, clinical features, types, and management of Neural Tube defect
30.5.1	Define Neural tube defects.
30.5.2	Enumerate all causes of Neural tube defects.
30.5.3	Describe pathogenesis of Neural tube defects.
30.5.4	Classify types of Neural tube defects.
30.5.5	Describe all the clinical features of the common types of Neural tube defects
30.5.6	Describe radiological investigations (USG local and USG Head, CT scan and MRI) and the relevant findings to diagnose Neural tube defects and associated conditions
30.5.7	Outline medical and surgical management including immediate treatment of neural tube defects.
30.5.8	Enumerate indications and contraindications of conservative and surgical modalities to treat neural tube defects.
30.5.9	Enumerate steps for prevention of neural tube defects.
30.5.6	Describe radiological investigations (USG local and USG Head, CT scan and MRI) and the relevant findings to diagnose Neural tube defects and associated conditions

PE 30.6	Discuss the etiopathogenesis, clinical features, and management of Infantile hemiplegia
30.6.1	Define infantile hemiplegia.
30.6.2	Enumerate all causes of infantile hemiplegia.
30.6.3	Describe pathogenesis of infantile hemiplegia.
30.6.4	Describe all the clinical features of infantile hemiplegia.
30.6.5	Enumerate investigations to diagnose infantile hemiplegia.
30.6.6	Describe all the treatment modalities for infantile hemiplegia including medical management, occupational therapy and physiotherapy.
PE 30.7	Discuss the etiopathogenesis, clinical features, complications and management of Febrile seizures in children
30.7.1	Define Febrile seizures.
30.7.2	Enumerate causes of Febrile seizures.
30.7.3	Describe the pathogenesis of Febrile seizures.
30.7.4	Classify types of Febrile seizures.
30.7.5	Describe the clinical features of different types of Febrile seizures.
30.7.6	Enumerate complications of Febrile seizures.
30.7.7	Enumerate the investigations for diagnosis of Febrile seizures and the cause of the underlying fever.
30.7.8	Describe the standard treatment for Febrile seizures in children including intermittent prophylaxis and treatment of cause of fever.
PE 30.8	Define epilepsy. Discuss the pathogenesis, clinical types, presentation and management of Epilepsy in children
30.8.1	Define Epilepsy.
30.8.2	Describe the pathogenesis of Epilepsy.
30.8.3	Classify clinical types of Epilepsy.
30.8.4	Describe the various presentations of Epilepsy.
30.8.5	Enumerate and Describe the investigations required to diagnose Epilepsy.
30.8.6	Outline the medical and surgical management of Epilepsy
30.8.7	Enumerate common Antiepileptic drugs and the types of Epilepsy in which they are indicated.
30.8.8	Enumerate the side effects of commonly used Antiepileptic drugs.
PE 30.9	Define Status Epilepticus. Discuss the clinical presentation and management
30.9.1	Define Status epilepticus.
30.9.2	Describe the clinical presentation of status epilepticus

30.9.4	Enumerate investigations required for diagnosis of status epilepticus
30.9.5	Describe management of status epilepticus in a step wise manner based on the standard algorithm of management of status epilepticus of the PICU
PE 30.10	Discuss the etiopathogenesis, clinical features and management of Mental retardation in children
30.10.1	Define Mental Retardation (Intellectual disability)
30.10.2	Enumerate the causes of Mental Retardation (Intellectual disability)
30.10.3	Describe the pathogenesis of Mental Retardation (Intellectual disability)
30.10.4	Classify Mental Retardation (Intellectual disability).
30.10.5	Enumerate and Describe clinical features of Mental Retardation (Intellectual disability) including dysmorphic features.
30.10.6	Describe the investigations for diagnosis of Mental Retardation (Intellectual disability).
30.10.7	Describe the investigations (including genetic tests) required for identifying the etiology of Mental Retardation (Intellectual disability).
30.10.8	Describe the multidisciplinary approach to management of Mental Retardation (Intellectual disability).
30.10.9	Describe the treatment of preventable and treatable causes of Mental Retardation (Intellectual disability).
PE 30.11	Discuss the etiopathogenesis, clinical features and management of children with cerebral palsy
30.11.1	Define Cerebral Palsy
30.11.2	Enumerate the causes of Cerebral Palsy
30.11.3	Describe the pathogenesis of Cerebral Palsy
30.11.4	Classify Cerebral Palsy.
30.11.5	Enumerate and Describe clinical features of different types of Cerebral Palsy
30.11.6	Describe the investigations required for identifying the etiology of Cerebral Palsy.
30.11.7	Describe the multidisciplinary approach to management of Cerebral Palsy.
30.11.8	Describe the treatment of preventable and treatable causes of Cerebral Palsy.
PE 30.12	Enumerate the causes of floppiness in an infant and discuss the clinical features, differential diagnosis and management
30.12.1	Define floppiness in an infant.
30.12.2	Enumerate the causes of floppiness in an infant.
30.12.3	Describe the pathogenesis of floppiness in an infant
30.12.4	Describe the clinical features of floppiness in an infant
30.12.5	Describe the differential diagnosis of floppiness in an infant
30.12.6	Enumerate the investigations for floppiness in an infant
30.12.7	Describe treatment approach to a floppy infant, including occupational therapy and physiotherapy.
PE 30.13	Discuss the etiopathogenesis, clinical features, management and prevention of Poliomyelitis in children
30.13.1	Define acute flaccid paralysis (AFP).
30.13.2	List causes of Acute Flaccid Paralysis.
30.13.3	Enumerate the viruses causing Poliomyelitis.
30.13.4	Describe the pathogenesis of Poliomyelitis
30.13.5	Describe all the clinical features of Poliomyelitis.

30.13.6	Discuss the differential diagnosis of AFP.
30.13.7	Describe all the treatment modalities for Poliomyelitis / AFP including medical management, occupational therapy and physiotherapy.
30.13.8	Describe the various available Polio vaccines and their role in prevention of poliomyelitis.
PE 30.14	Discuss the etiopathogenesis, clinical features and management of Duchene muscular dystrophy
30.14.1	Define Duchene muscular dystrophy.
30.14.2	Describe the etiopathogenesis of Duchene muscular dystrophy
30.14.3	Describe the clinical features of Duchene muscular dystrophy.
30.14.4	Enumerate investigations required including genetic testing to diagnose Duchene muscular dystrophy.
30.14.5	Describe the treatment modalities for Duchene muscular dystrophy including occupational therapy and physiotherapy.
PE 30.15	Discuss the etiopathogenesis, clinical features and management of Ataxia in children
30.15.1	Define Ataxia in children.
30.15.2	Enumerate all causes of Ataxia in children.
30.15.3	Describe the pathogenesis of Ataxia in children.
30.15.4	Describe all the clinical features of Ataxia in children.
30.15.5	Enumerate the investigations in evaluation of Ataxia in children.
PE 30.16	Discuss the approach to and management of a child with headache
30.16.1	Enumerate causes of headache in children
30.16.2	Enumerate the types of headache
30.16.3	Describe the clinical features of various types of headaches in children
30.16.4	Enumerate all investigations to diagnose cause and type of headache.
30.16.5	Analyse the history and interpret the examination findings and investigations using an algorithm to come to a differential diagnosis/ diagnosis of headache
30.16.6	Discuss approach to management of headache based on history, examination and investigations
30.16.7	Describe treatment of a child with headache.

CLINICS:

MBBS PHASE II:

- 1.4-Perform Anthropometric measurements, document in growth charts and interpret.
- 1.7-Perform Developmental assessment and interpret
- **PE-20.4 Assessment of a normal neonate**

- 9.4-Elicit document and present an appropriate nutritional history and perform a dietary recall.
- 9.6-Assess and classify the nutrition status of infants, children and adolescents and recognize deviations.
- 9.7- Plan an appropriate diet in health and disease
- Elicit history on the complementary feeding habits
- Counsel and educate mothers on the best practices in complementary feeding
- 7.7-Perform breast examination and identify common problems during lactation such as retracted nipples, cracked nipples, breast engorgement, breast abscess.
- 7.8, - Educate mothers on ante natal breast care and prepare mothers for lactation.
- 7.9, Educate and counsel mothers for best practices in Breast feeding.
- 7.10, Respects patient privacy
- 7.11-Participate in Breast Feeding Week Celebration
- 6.8-Respecting patient privacy and maintaining confidentiality while dealing with adolescence.
- 6.9- Perform routine Adolescent Health check up including eliciting history, performing examination including SMR (Sexual Maturity Rating), growth assessments (using Growth charts) and systemic exam including thyroid and Breast exam and the HEADSS screening.
- 2.2-Assessment of a child with failing to thrive including eliciting an appropriate history and examination.
- 2.3-Counselling a parent with failing to thrive child.
- 2.5-Assessment of a child with short stature: Elicit history, perform examination, document and present
- 11.4- Examination including calculation of BMI, measurement of waist hip ratio, identifying external markers like acanthosis, striae, pseudogynaecomastia etc.
- **11.5- Calculate BMI, document in BMI chart and interpret**

CBME MBBS phase III part I

PE32.2	Identify the clinical features of Down's Syndrome
PE32.3	Interpret normal Karyotype and recognize Trisomy 21
PE32.5	Counsel parents regarding 1. Present child 2. Risk in the next pregnancy
PE32.7	Identify the clinical features of Turner Syndrome
PE32.8	Interpret normal Karyotype and recognize the Turner Karyotype
PE32.10	Counsel parents regarding 1. Present child 2. Risk in the next pregnancy
PE32.12	Identify the clinical features of Klinefelter Syndrome
PE32.13	Interpret normal Karyotype and recognize the Klinefelter Karyotype
PE3.3	Assessment of a child with developmental delay - Elicit document and present history
PE3.4	Counsel a parent of a child with developmental delay
PE19.6	Assess patient for fitness for immunization and prescribe an age appropriate immunization schedule
PE19.7	Educate and counsel a patient for immunization
PE19.10	Observe the handling and storing of vaccines
PE19.11	Document Immunization in an immunization record
PE19.12	Observe the administration of UIP vaccines
PE19.13	Demonstrate the correct administration of different vaccines in a mannequin
PE19.14	Practice Infection control measures and appropriate handling of the sharps
PE19.15	Explain the term implied consent in Immunization services
PE10.3	Assessment of a patient with SAM and MAM, diagnosis, classification and planning management including hospital and community based intervention, rehabilitation and prevention.
PE10.4	Identify children with under nutrition as per IMNCI criteria and plan referral
PE10.5	Counsel parents of children with SAM and MAM
PE9.5	Calculate the age related calorie requirement in Health and Disease & identify gap
PE12.4	Diagnose patients with Vitamin A deficiency, classify and plan management
PE12.17	Identify the clinical features of Vitamin B complex deficiency
PE12.18	Diagnose patients with Vitamin B complex deficiency and plan management
PE12.21	Identify the clinical features of Vitamin C deficiency
PE12.8	Identify the clinical features of dietary deficiency of Vitamin D
PE12.9	Assess patients with Vitamin D deficiency, diagnose, classify and plan management
PE18.6	Perform Postnatal assessment of new born and mother, provide advice on breast feeding, weaning and on family planning
PE18.7	Educate and counsel caregivers of children
PE18.8	Observe the implementation of the program by visiting the Rural Health Centre
PE20.5	Counsel / educate mothers on the care of neonates
PE20.6	Explain the follow up care for neonates including Breast Feeding, Temperature maintenance, immunization, importance of growth monitoring and red flags
PE33.7	Perform genital examination and recognize Ambiguous Genitalia and refer appropriately
PE7.5	Observe the correct technique of breast feeding and distinguish right from wrong techniques
PE26.5	Elicit document and present the history related to diseases of Gastrointestinal system
PE26.7	Perform examination of the abdomen, demonstrate organomegaly, ascites etc.
PE29.12	Perform examination of the abdomen, demonstrate organomegaly
PE23.7	Elicit appropriate history for a cardiac disease, analyse the symptoms e.g. Breathlessness,

	chest pain, tachycardia, feeding difficulty, failing to thrive, reduced urinary output, swelling, syncope, cyanotic spells, Suck rest cycle, frontal swelling in infants. Document and present
PE23.9	Record pulse, blood pressure, temperature and respiratory rate and interpret as per the age
PE23.8	Identify external markers of a cardiac disease e.g., Cyanosis, Clubbing, dependent edema, dental caries, arthritis, erythema rash, chorea, subcutaneous nodules, Osler's node, Janeway lesions and document
PE 23.10	Examination of the cardiovascular system – look for precordial bulge, pulsations in the precordium, JVP and its significance in children and infants, relevance of percussion in Paediatric examination, Auscultation and other system examination and document
PE18.3	Conduct Antenatal examination of women independently and apply at-risk approach in antenatal care
PE18.4	Provide intra-natal care and conduct a normal delivery in a simulated environment
PE18.5	Provide intra-natal care and observe the conduct of a normal delivery
PE30.17	Elicit document and present an age appropriate history pertaining to the CNS
PE30.18	Demonstrate the correct method for physical examination of CNS including identification of external markers. Document and present clinical findings
PE31.2	Recognize the clinical signs of Allergic Rhinitis
PE28.9	Elicit, document and present age appropriate history of a child with upper respiratory problem including Stridor
PE28.10	Perform otoscopic examination of the ear
PE28.11	Perform throat examination using tongue depressor
PE28.12	Perform examination of the nose
PE28.13	Analyse the clinical symptoms and interpret physical findings and make a provisional / differential diagnosis in a child with ENT symptoms
PE28.14	Develop a treatment plan and document appropriately in a child with upper respiratory symptoms
PE28.16	Interpret blood tests relevant to upper respiratory problems
PE28.17	Interpret X-ray of the paranasal sinuses and mastoid; and /or use written report in case of management Interpret CXR in foreign body aspiration and lower respiratory tract infection, understand the significance of thymic shadow in paediatric chest X-rays
PE31.4	Identify Atopic dermatitis and manage
	Lower respiratory system
PE34.5	Able to elicit, document and present history of contact with tuberculosis in every patient encounter
PE34.6	Identify a BCG scar
PE34.7	Interpret a Mantoux test
PE34.8	Interpret a Chest Radiograph
PE34.9	Interpret blood tests in the context of laboratory evidence for tuberculosis
PE34.10	Discuss the various samples for demonstrating the organism e.g. Gastric Aspirate, Sputum , CSF, FNAC
PE34.11	Perform AFB staining
PE34.12	Enumerate the indications and discuss the limitations of methods of culturing M.Tuberculi
PE21.8	Elicit, document and present a history pertaining to diseases of the Genitourinary tract
PE21.9	Identify external markers for Kidney disease, like Failing to thrive, hypertension, pallor, Ichthyosis, anasarca
PE21.10	Analyse symptom and interpret the physical findings and arrive at an appropriate provisional / differential diagnosis
PE21.11	Perform and interpret the common analytes in a Urine examination
PE21.14	Recognize common surgical conditions of the abdomen and genitourinary system and enumerate the indications for referral including acute and subacute intestinal obstruction, appendicitis, pancreatitis, perforation intussusception, Phimosis, undescended testis, Chordee, hypospadias, Torsion testis, hernia Hydrocele, VulvalSynechiae
PE13.3	Identify the clinical features of dietary deficiency of Iron and make a diagnosis
PE13.4	Interpret hemogram and Iron Panel

PE13.5	Propose a management plan for Fe deficiency anaemia
PE29.10	Elicit, document and present the history related to Haematology
PE29.11	Identify external markers for haematological disorders e.g.. Jaundice, Pallor, Petechiae purpura, Ecchymosis, Lymphadenopathy, bone tenderness, loss of weight, Mucosal and large joint bleed
PE29.13	Analyse symptoms and interpret physical signs to make a provisional/ differential diagnosis
PE24.9	Elicit, document and present history pertaining to diarrheal diseases
PE24.10	Assess for signs of dehydration, document and present
PE24.11	Apply the IMNCI guidelines in risk stratification of children with diarrheal dehydration and refer
PE27.23	Assess for signs of severe dehydration
PE24.12	Perform and interpret stool examination including Hanging Drop
PE24.13	Interpret RFT and electrolyte report
PE24.14	Plan fluid management as per the WHO criteria
PE11.3	Assessment of a child with obesity with regard to eliciting history including physical activity, charting and dietary recall
PE11.6	Discuss criteria for referral
PE-11.4,11.5	11.4- Examination including calculation of BMI, measurement of waist hip ratio, identifying external markers like acanthosis, striae, pseudogynaecomastia etc. 11.5- Calculate BMI, document in BMI chart and interpret
PE33.9	Perform Sexual Maturity Rating (SMR) and interpret
PE33.10	Recognize precocious and delayed Puberty and refer
PE33.11	Identify deviations in growth and plan appropriate referral
PE 27.28	Provide BLS for children in manikin
PE 24.15	Perform NG tube insertion in a manikin
PE 24.16	Perform IV cannulation in a model
PE 24.17	Perform Interosseous insertion in a model
PE31.6	Recognise symptoms and signs of Asthma
PE31.7	Develop a treatment plan for Asthma appropriate to clinical presentation & severity
PE31.8	Enumerate criteria for referral
PE31.9	Interpret CBC and CX Ray in Asthma
PE31.10	Enumerate the indications for PFT
PE31.11	Observe administration of Nebulisation

MBBS PHASE 3 PART2

PE15.3	Calculate the fluid and electrolyte requirement in health
PE15.4	Interpret electrolyte report
PE15.5	Calculate fluid and electrolyte imbalance
PE15.6	Demonstrate the steps of inserting an IV cannula in a model
PE15.7	Demonstrate the steps of inserting an interosseous line in a mannequin
PE20.3	Perform Neonatal resuscitation in a manikin
PE21.12	Interpret report of Plain X Ray of KUB
PE21.13	Enumerate the indications for and Interpret the written report of Ultra sonogram of KUB
PE21.15	Discuss and enumerate the referral criteria for children with genitourinary disorder
PE21.16	Counsel / educate a patient for referral appropriately
PE23.11	Develop a treatment plan and prescribe appropriate drugs including fluids in cardiac diseases, anti -failure drugs, and inotropic agents
PE23.12	Interpret a chest X ray and recognize Cardiomegaly
PE23.13	Choose and Interpret blood reports in Cardiac illness
PE23.14	Interpret Pediatric ECG
PE23.15	Use the ECHO reports in management of cases
PE23.16	Discuss the indications and limitations of Cardiac catheterization

PE23.17	Enumerate some common cardiac surgeries like BT shunt, Potts and Waterston's and corrective surgeries
PE23.18	Demonstrate empathy while dealing with children with cardiac diseases in every patient encounter
PE26.6	Identify external markers for GI and Liver disorders e.g. Jaundice, Pallor, Gynecomastia, Spider angioma, Palmar erythema, Ichthyosis, Caput medusa, Clubbing, Failing to thrive, Vitamin A and D deficiency
PE26.8	Analyse symptoms and interpret physical signs to make a provisional/ differential diagnosis
PE26.9	Interpret Liver Function Tests, viral markers, ultra sonogram report
PE26.10	Demonstrate the technique of liver biopsy in a Perform Liver Biopsy in a simulated environment
PE26.11	Enumerate the indications for Upper GI endoscopy
PE26.13	Counsel and educate patients and their family appropriately on liver diseases
PE27.10	Observe the various methods of administering Oxygen
PE27.14	Assess emergency signs and prioritize
PE27.16	Assess airway and breathing. Demonstrate the method of positioning of an infant & child to open airway in a simulated environment
PE27.17	Assess airway and breathing: administer oxygen using correct technique and appropriate flow rate
PE27.18	Assess airway and breathing: perform assisted ventilation by Bag and mask in a simulated environment
PE27.20	Secure an IV access in a simulated environment
PE27.22	Assess level of consciousness & provide emergency treatment to a child with convulsions/ coma - Position an unconscious child - Position a child with suspected trauma - Administer IV/per rectal Diazepam for a convulsing child in a simulated environment
PE27.27	Assess for hypothermia and maintain temperature
PE27.30	Demonstrate confidentiality with regard to abuse
PE27.31	Assess child for signs of abuse
PE27.32	Counsel parents of dangerously ill / terminally ill child to break a bad news
PE27.33	Obtain Informed Consent
PE27.34	Willing to be a part of the ER team
PE27.35	Attends to emergency calls promptly
PE29.10	Elicit, document and present the history related to Hematology
PE29.11	Identify external markers for hematological disorders e.g.. Jaundice, Pallor, Petechiae purpura, Ecchymosis, Lymphadenopathy, bone tenderness, loss of weight, Mucosal and large joint bleed
PE29.13	Analyse symptoms and interpret physical signs to make a provisional/ differential diagnosis
PE29.14	Interpret CBC, LFT
PE29.15	Perform and interpret peripheral smear
PE29.17	Demonstrate performance of bone marrow aspiration in manikin
PE29.18	Enumerate the referral criteria for Hematological conditions
PE29.19	Counsel and educate patients about prevention and treatment of anemia
PE29.20	Enumerate the indications for splenectomy and precautions
PE30.19	Analyse symptoms and interpret physical findings and propose a provisional / differential diagnosis
PE30.20	Interpret and explain the findings in a CSF analysis

PE30.21	Enumerate the indication and discuss the limitations of EEG, CT, MRI
PE30.22	Interpret the reports of EEG, CT, MRI
PE30.23	Perform in a mannequin lumbar puncture. Discuss the indications, contraindication of the procedure

Certifiable Procedural skills desirable of Indian Medical Graduate in pediatrics(perform level):

	Phase 3 part 1
1.	Perform Anthropometric measurements, document in growth charts and interpret.
2.	Calculate BMI, document in BMI chart and interpret
3.	Identify deviations in growth and plan appropriate referral
4.	Perform Developmental assessment and interpret
5.	Observe the correct technique of breast feeding and distinguish right from wrong techniques
6.	Assess patient for fitness for immunization and prescribe an age appropriate immunization schedule
7.	Identify a BCG scar
8.	Interpret a Mantoux test
9.	Interpret a Chest Radiograph
10.	Assess airway and breathing: recognise signs of severe respiratory distress. Check for cyanosis, severe chest in drawing, grunting
11.	Check for signs of shock i.e. pulse, Blood pressure, CRT

12.	Choose the type of fluid and calculate the fluid requirement in shock
13.	Assess for signs of severe dehydration
14.	Perform and interpret Urine Dip Stick for Sugar

In Skill lab:

	Phase 3 part 1
1.	Provide BLS for children in manikin
2.	Perform NG tube insertion in a manikin
3.	Perform Interosseous insertion in a model
4.	Perform IV cannulation in a model, Secure an IV access in a simulated environment-

	Phase 3 part 2
	Assess airway and breathing. Demonstrate the method of positioning of an infant & child to open airway in a simulated environment
	Assess airway and breathing: administer oxygen using correct technique and appropriate flow rate
	Assess airway and breathing: perform assisted ventilation by bag and mask in a simulated environment
	Assess level of consciousness & provide emergency treatment to a child with convulsions/ coma

List of Competencies in Pediatrics That Require Certification (Perform Level)	
Competency	No. required
Perform Anthropometric measurements, document in growth charts and interpret	3
Perform Developmental assessment and interpret	3
Observe the correct technique of breast feeding and distinguish right from wrong techniques	3
Calculate BMI, document in BMI chart and interpret	3
Assess patient for fitness for immunization and prescribe an age-appropriate immunization schedule	5
Perform NG tube insertion in a manikin	2
Perform IV cannulation in a model	2
Perform Intraosseous insertion in a model	2
Assess airway and breathing: recognize signs of severe respiratory distress. Check for cyanosis, severe chest indrawing, grunting	3
Assess airway and breathing. Demonstrate the method of positioning of an infant & child to open airway in a simulated environment	3
Assess airway and breathing: administer oxygen using correct technique and appropriate flow rate	3
Assess airway and breathing: perform assisted ventilation by bag and mask in a simulated environment	3
Check for signs of shock i.e. pulse, Blood pressure, CRT	3
Secure an IV access in a simulated environment	3
Choose the type of fluid and calculate the fluid requirement in shock	3
Assess level of consciousness and provide emergency treatment to a child with convulsions/coma	3
Assess for signs of severe dehydration	3
Provide BLS for children on a manikin	3

Perform and interpret Urine DipStick for Sugar	3
Identify deviations in growth and plan appropriate referral	2
Identify a BCG scar	3
Interpret a Mantoux test	3
Perform AFB staining	3

Record keeping(LOG BOOK)

A good record keeping in the form of a logbook should be maintained. Log book should record all activities like seminar, symposia, quizzes and other academic activities. Achievement of certifiable competencies should also be recorded in logbooks. The log book should be completed and evaluated by the faculty on a timely basis.

Upto 20% of the internal assessment marks will be allotted from the log book .

Attendance:

Student should have a minimum of 75% attendance in theory in each phase and 80% in clinics in each phase to be eligible to take the university examinations.

Assessment:

The MCI guidelines have emphasized the role of formative and internal assessment in acquisition and development of competencies. MCI recommendations have proposed minimum of two tests per professional year for the clinical subjects supplemented by unlimited opportunities for formative ongoing assessments.

Eligibility to take university exams:

50% combined in theory and practical with minimum 40% in each is required to be eligible for appearing for university examinations

Assessments will be conducted as :

- Formative Assessments
- Internal Assessments
- Summative Assessments

A) Formative assessment:

Formative assessments will be conducted as Quiz, multiple choice questions, etc

B) Internal assessment:

Internal assessment marks are shown separately in the final report and are not added to marks of the University

Theory:

A theory paper will be a written exam.

Each written paper is for 50 marks with a duration of 90 minutes.

After completing the theory lecture hours, as per schedule, there will be internal assessment at the end of each term during the allotted time

The average of all the 4 internal assessments will be taken as the final marks.

40% is considered as the pass criteria for theory in each assessment

Practicals:

All certifiable skills will be assessed and recorded in the log book

Practical assessment will be conducted at the end of each clinical posting.

Assessment is for 50marks.

OSCE will be for 10 marks.

Assessment of logbook and case record book is for 10 marks

Case presentation is for 30 marks.

The average of all the internal assessments will be taken as the final marks.

40% is considered as the pass criteria for practicals/clinics

A satisfactory performance in internal assessment (50% combined in theory and practical, minimum 40% in each) is still required to be eligible for appearing for university examinations

	Phase 2 professional	Phase 3 Part 1/II professional	Phase 3 phase 2/III professional	
		Block 1 and 2	Block 3	Block 4
Theory exams		Twice FA (Quiz or assignment) + 1 st IA Theory – 50 marks paper for 90 mins, with 10 marks as MCQ, 1 long essay (10marks), 3 short essay (3x5marks=15marks), 5 short answers(5x3marks=15marks)	Twice FA+ 2nd IA Theory – 50 marks paper for 90 mins, with 10 marks as MCQ, 1 long essay (10marks), 3 short essay (3x5marks=15marks), 5 short answers(5x3marks=15marks)	Prelims-Theory – 100 marks paper for 180mins,(, with 20 marks as MCQ, 1 long essay (10marks), 3 short essay (8x5marks=40marks), 5 short answers(10x3marks=30marks)

Theory Attendance	75%	75%	75%	
Practical exams	End of I clinical posting (2 wk)	End of III clinical posting (4 wk)	End of II clinical posting (4 wk)	
Clinical Attendance	80%	80%	80%	
50% combined in theory and practical, minimum 40% in each) is required to be eligible for appearing for university examinations				
Summative Examination:				
University examination	-		-	
Theory				1 paper: 100 marks for 3 hours
Practical/oral/clinical				100 marks
Pass criteria	None		None	50% separately in theory and practical

FA:Formative assessment

Pass criteria for internal assessment:

50% combined in theory and practical, minimum 40% in each) is required to be eligible for appearing for university examinations

Summative Assessment (University Examination) in Pediatrics

Target: Final Year MBBS Student;
Type: Summative;
Timeline: At the end of Phase 3 (Third Professional – Part II examination)

PART /TIME	SECTION	TYPE OF QUESTION	QUESTIONS-NO	SYLABUS CONTENT	MARKS ALLOTED
A-30 MIN		MCQ	20	Entire syllabus	20
B-150 MIN		Long question	1	Topic 1 to 35	10
		Short Essay question (1 Essay Q from AETCOM)	8	Topics 1 to 35	5 marks each
		Short answers	10	Topics 1 to 35	3 marks each
					Total =100 marks

Theory: 100 marks/ duration 3 hours

1. There will be one theory paper with two PARTS A and B .
2. PART A will be only multiple choice questions (MCQ) & Part B will contain Long question, Short Essay question (1 Essay Q from AETCOM), Short answers
3. Questions to be framed as per guidelines given in Assessment Module of CISP

Practical: 100 mark

4. To be conducted in batches of not more than 25 per day
 5. At the end of the day, the student should have been exposed to all the examiners available on that day.
 6. 4 examiners, 50% should be external examiners.
 7. Assessment will consist of 2 pediatric cases (30 marks each), 1 newborn case (20 marks), and Viva-voce (4 stations of 5 marks each- Nutrition, Drugs and vaccines, instruments, X rays).(30+30+20+20=100)
- A. Pediatric cases (conventional case presentation)
Each student will get two cases each as follows:

Case 1: General Pediatrics (30 marks)

- Case examination (including direct observation) 20 minutes and interaction with examiner: 15 min

Case 2: Systemic Pediatrics (30 marks)

- Case examination (including direct observation) 20 minutes, and 20 minutes and interaction with examiner: 15 min

Both cases should be taken by different set of examiners. The examiners should ensure assessment on direct observations of various competencies including history taking, examination, and counseling.

Pass criteria for university examination:

Theory: 50%

Practicals: 50%

combined theory and practicals: 50%

case 3. Newborn case (20 minutes station-20 marks) Directly observed history taking/examination of newborn/counseling of mother. Directly observed procedural skills on Neonatal resuscitation will also be assessed on manikin and related equipment.

Case4. Viva-voce (4 stations each of 5 min) • 4 stations of 5 marks each- Nutrition, Drugs and vaccines, instruments, X rays,

Suggested cases for clinical examination:

1. Gastrointestinal and hepatobiliary system
Distension of abdomen and Hepatosplenomegaly
 2. Renal
Nephrotic syndrome
 3. Central nervous system:
Global developmental delay
Meningitis/meningitic sequelae.
Cerebral palsy.
Hemiplegia. Paraplegia, Quadriplegia
Febrile seizure
Seizure disorder
 4. Cardiovascular system:
Rheumatic heart disease – M.S., M.R, Carditis.
Congenital heart disease – VSD, PDA, TOF.
Congestive cardiac failure
 5. Respiratory system
Pneumonia. pleural effusion
Empyema.
Suppurative lung disease.
Wheeze and Asthma
Tuberculosis
 6. Hematopoietic system:
Anemia
 7. Assessment of growth and development in a normal child.
Kwashiorkor, Marasmus
Severe acute malnutrition
Overweight and obesity
Assessment of dehydration
 8. Neonate: normal neonate
Low birth weight
Neonatal jaundice
 9. Miscellaneous
Short stature and Turner's syndrome
Downs syndrome
Cretinism.
- Skill assessment:
1. Instruments used in pediatrics
 2. Drugs and Vaccines
 3. Dietetics in children
 4. X Rays of common disorder

Reference Books**Text Books Recommended**

1. Ghai O.P., Textbook of Pediatrics
2. Meharban Singh, Textbook of Neonatology
4. Meharban Singh, Clinical Methods
5. Hutchison's Clinical Methods
6. Indian Association of Pediatrics (IAP), Textbook of Pediatrics,

Books for Selected Reading

1. Behrman Richard E Vaughah Victor C: Nelson Textbook of Pediatrics
2. Forfar & Arneil, Textbook of Pediatrics
3. Gupta P, Shah D, Singh T. Competency-based assessment in pediatrics for the new undergraduate curriculum. Indian Pediatrics. 2021 Aug; 58(8): 775-9.

The above curriculum is subject to changes as per NMC regulation.

Curriculum for Dermatology, Venerology and Leprosy 2022



**Ramaiah Medical College
Ramaiah University of Applied
Sciences
Bengaluru-560054**

Department of Dermatology
UG Curriculum

Introduction to the department:

The department of dermatology has committed and dedicated faculty to deliver quality teaching and training for undergraduate students since its inception (1984). The students are trained intensely with an allotted 30 hours of theory and 4 weeks of clinical postings during their entire course. The department has enough clinical material as well as the basic and sophisticated equipments in delivering quality training for undergraduates.

Goal:

The aim of teaching the undergraduate student in dermatology, venereology and leprology is to impart such knowledge and skills that may enable the student in future to diagnose and treat common ailments and to refer rare diseases or complications/ unusual manifestations of common diseases, to the specialist.

Objectives:

1. Knowledge:

At the end of the course of dermatology, venereology and leprosy, the student shall be able to:

- Demonstrate sound knowledge of common skin disorders, their clinical manifestations including investigations to confirm the diagnosis.
- Demonstrate comprehensive knowledge of various modes of topical therapy
- Describe the mode of action, dosage and adverse effects of commonly used drugs in dermatology
- Diagnose and manage emergencies specially recognizing the need for referral when appropriate and necessary.

2. Skills:

The student shall be able to:

- Elicit relevant history and information in chronological order.
- Appreciate and interpret cutaneous findings during examination to diagnose common dermatological disorders
- Perform simple and bedside investigations like scraping for fungus, Gram stain preparation
- Manage common dermatological conditions and able to refer patients who require specialized care.

Theory

Teaching -learning methods:

The university incorporates the guidelines of the CBME curriculum prescribed by the National Medical Commission (NMC). The department uses various innovative teaching learning methods to facilitate effective student learning.

Teaching learning methodology	Hours
Lecture (L)	20
Small Group Discussion (SGD)	3
Self-Directed Learning (SDL)	5
Integrated Teaching (IT)	2
Total	30

Assessment methods:

Formative Assessment: At the end of the class, 10 MCQs will be given and assessment will be done accordingly

Summative Assessment: Summative assessment will be done at the end of the theory class session for 50 marks consisting of
 10 questions of 1 mark each $10 \times 1 = 10$
 10 questions of 2 marks each $10 \times 2 = 20$
 5 questions of 4 marks each $5 \times 4 = 20$
 The final assessment marks will be sent to department of medicine to be added to their assessment marks

Guidelines for internal assessment:

N/A

Practical:

The students will have 2 weeks each of clinical postings during phase II part II and phase III part I.

Course outcomes

1. Able to Diagnose and treat common dermatologic conditions
2. Able to perform common side lab procedures like KOH examination and Gram stain
3. Able to refer patients to higher centres requiring specialized care

Assessment

1. Formative assessment at the end of SDL & SGD –MCQ based
2. Summative assessment at the end of the term through Internal assessment
3. Practical skills assessment intern through log book.

Syllabus:

Block I

Week	Topic	Competency	T-L Methods Lecture SGD- Seminar/ Tutorials/ IT SDL	
1.	Bacterial Infections	Enumerate the indications and describe the pharmacology, indications and adverse reactions of topical and systemic drugs used in treatment of pyoderma.	Lecture	
2.	Syphilis	Identify and classify syphilis based on the presentation and clinical manifestations enumerate the indications and describe the	Lecture	

		pharmacology, administration, and adverse reaction of pharmacotherapies for syphilis.		
3.	Congenital Syphilis	Describe the prevention of congenital syphilis. SDL	SDL	
4.	Chancroid Herpes genitalis	Describe the aetiology, diagnostic and clinical features of non- syphilitic sexually transmitted diseases-chancroid & herpes genitalis Enumerate the indications and describe the pharmacology, indications and adverse reactions of drugs used in the non-syphilitic sexually transmitted diseases. Chancroid & herpes genitalis–Treatment	Lecture	
5.	Donovanosis LGV	Describe the aetiology, diagnostic and clinical features of non- syphilitic sexually transmitted diseases-Donovanosis and LGV. Enumerate the indications and describe the pharmacology, indications and adverse reactions of drugs used in the non-syphilitic sexually transmitted diseases. Donovanosis and LGV –Treatment	Lecture	
6.	Gonococcal infections	Describe the etiology, diagnostic and clinical features and management of gonococcal and non-	Lecture	

		gonococcal urethritis .		
7.	Vaginal Discharge	Describe the etiology, diagnostic and clinical features and management of vaginal discharge.	Lecture	
8.	Syndromic approach to STDs	Describe the syndromic approach to ulcerative sexually transmitted disease.	Lecture	
9.	Scabies and Pediculosis	Describe the etiology, microbiology, pathogenesis, natural history, clinical features, presentations and complications of scabies in adults and children Enumerate and describe the pharmacology, administration and adverse reaction of pharmacotherapies for scabies Describe the etiology pathogenesis and diagnostic features of pediculosis in adults and children.	Lecture	
10.	Viral infections I	Describe the etiology, microbiology, pathogenesis and clinical presentations and diagnostic features of common viral infections of the skin in adults and children.	Lecture	
11.	Viral infections II	Enumerate the indications and describe the pharmacology, administration and adverse reaction of pharmacotherapies for common viral illnesses of the skin.	SGD	
12.	HIV infection I	Describe the etiology, pathogenesis and clinical features of the	Integrated Teaching with department of MEDICINE	

		dermatologic manifestations of HIV and its complications including opportunistic infections.		
13.	HIV infection II	Enumerate the indications and describe the pharmacology, administration and adverse reaction of pharmacotherapies for dermatologic lesions in HIV.	SGD	
14.	Fungal infections I	Describe the etiology, microbiology, pathogenesis, and clinical presentations and diagnostic features of dermatophytes in adults and children.	Lecture	
15.	Fungal infections II	Describe the pharmacology and action of antifungal (systemic and topical) agents. Enumerate side effects of antifungal therapy .	SDL	
16.	Leprosy I	Classify, describe the epidemiology, etiology, microbiology, pathogenesis, clinical presentations and diagnostic features of Leprosy .	Lecture	
17.	Leprosy II	Enumerate, describe, and identify lepra reactions and supportive measures and therapy of lepra reactions Enumerate the indications and describe the pharmacology, administration and adverse reaction of pharmacotherapies for	Lecture	

		various classes of leprosy based on national guidelines .		
18.	Leprosy III	Enumerate and describe the complications of leprosy and its management, including understanding disability and stigma. Understanding the NLEP (National Leprosy Eradication Programme)	Integrated Teaching with department of COMMUNITY MEDICINE	
19.	Leprosy IV	Describe the treatment of leprosy based on the WHO guidelines.	SDL	

Block II

Week	Topic	Competency	Lecture SGD- Seminar/ Tutorials/ IT SDL	
20 .	Diabetes and Skin	Enumerate the cutaneous features of Type 2 Diabetes	Lecture	
21.	Acne Vulgaris	Enumerate the causative and risk factors of acne Describe the treatment and preventive measures for various kinds of acne.	Lecture	
22.	Thyroid disorders and skin	Enumerate the cutaneous features of hypo/hyper-thyroidism.	SDL	
23.	Nutritional Dermatoses I	Enumerate and identify the cutaneous findings in vitamin A deficiency Enumerate and describe various changes in vitamin C deficiency.	SGD	
24.	Nutritional Dermatoses II	Enumerate and describe the various skin changes in vitamin B complex deficiency.	Lecture	
25.	Nutritional Dermatoses III	Enumerate and describe the various changes in zinc deficiency.	SDL	
26.	Eczema	Describe the aetiopathogenesis of eczema	Lecture	

		Classify and grade eczema Enumerate the indications and describe the pharmacology, indications and adverse reactions of drugs used in the treatment of eczema.		
27.	Urticaria and Angioedema	Describe the etiology, pathogenesis and clinical features precipitating factors and classification of Urticaria and angioedema.	Lecture	
28.	Psoriasis	Enumerate the indications for and describe the various modalities of treatment of psoriasis including topical, systemic and phototherapy	Lecture	
29.	Lichen Planus	Enumerate and describe the treatment modalities for lichen planus.	Lecture	
30.	Vitiligo	Describe the treatment of vitiligo	Lecture	

A) Clinical postings:

The students are posted to the department of Dermatology for 2 weeks each in phase II part II (5 days/week) and in phase III part I (6 days/ week)

Topics for Phase II Part II : 2 weeks duration (5 Days/ week)

Day	Topic
1.	Introduction to subject: Anatomy of skin and appendages, Physiology
2.	Basics: History taking and Cutaneous Examination
3.	Basics of Leprosy
4.	Basics of STI
5.	Viral infections
6.	Bacterial infection
7.	Fungal infection
8.	Psoriasis and lichen planus
9.	Acne
10.	Eczema

Topics for phase III part I: 2 weeks duration (6 days / week)

Day	Topic
1.	Identify and distinguish viral warts from other skin lesions. Identify and distinguish molluscum contagiosum from other skin lesions.

2.	Identify and differentiate scabies from other lesions in adults and children
3.	Identify and differentiate pediculosis from other skin lesions in adults
4.	Demonstrate (and classify based on) the clinical features of leprosy including an appropriate neurologic examination
5.	Identify and classify syphilis based on the presentation and clinical manifestations
6.	Identify and differentiate based on the clinical features non-syphilitic sexually transmitted diseases (chancroid, donovanosis and LGV)
7.	Identify and differentiate vitiligo from other causes of hypopigmented lesions
8.	Define erythroderma. Enumerate and identify the causes of erythroderma. Discuss the treatment. Identify and distinguish exfoliative dermatitis from other skin lesions
9.	Identify and distinguish urticaria from other skin lesions. Demonstrate dermographism
10.	Identify atopic dermatitis and manage (in children and in adults)
11.	Distinguish bulla from vesicles. Calculate the body surface area of involvement of vesiculobullous lesions
12.	Identify and distinguish skin lesions of SLE

Course outcomes

4. Able to Diagnose and treat common dermatologic conditions
5. Able to perform common side lab procedures like KOH examination and Gram stain
6. Able to refer patients to higher centres requiring specialized care

Assessment

4. Formative assessment at the end of SDL & SGD –MCQ based
5. Summative assessment at the end of the term through Internal assessment
6. Practical skills assessment intern through log book.



Curriculum for Psychiatry 2022



**Ramaiah Medical College
Ramaiah University of Applied Sciences
Bengaluru-560054**

to Department:

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DEPARTMENT OF PSYCHIATRY

Curriculum

Psychiatry is the medical specialty devoted to the diagnosis, prevention, and treatment of mental disorders. These include various maladaptations related to mood, behaviour, cognition, and emotions. A knowledge of psychiatry is not only essential for treatment of mental disorders but also necessary for the holistic understanding of human suffering and its alleviation. Hence, a detailed psychiatry curriculum is required as a foundation upon which the normal as well as the abnormal human behaviour, cognition and emotions can be explained.

The Psychiatry department comprises a multidisciplinary team of Psychiatrists and Clinical Psychologists who are well qualified and experienced in the area of mental health. The department offers extensive services in treating various mental health issues and alleviating the suffering of persons with Psychiatric disorders, emotional, behavioral and stress related problems. The team is also proactive in addressing mental health issues of students of all disciplines and health care workers. The team has liaison with other departments and caters to psychological problems associated with various physical illnesses. The department prides itself in tailoring treatments in an individualized and person centric approach.

The teaching faculty of Psychiatry are qualified and competent. They are trained to impart quality

education. The faculty have excelled in patient care, recent advances, research and innovative teaching methodology. The department also promotes student research program to inculcate the basic research methodology concepts.

This curriculum document in Psychiatry is prepared in conjunction with Graduate Medical Education Regulations, 2019 and it stands on the shoulder of the contributions and efforts of faculty in the department of psychiatry, as well as resource persons from Board of Studies & Curriculum committee. Also, the guidelines from Indian Psychiatric Society have been incorporated so as to bring uniformity across the nation.

Goal:

The primary goal of this curriculum in psychiatry is to make the Indian Medical Graduate a better clinician who understands and provides preventive, promotive, curative, palliative and holistic care with compassion and better communicator with patients & families.

Objectives:

A. Cognitive Domain - At the end of the course the student should be able to: -

1. Describe the importance of doctor patient relationship, history of psychiatry as a speciality and fundamentals in mental health
2. Describe the epidemiology, clinical features, pharmacological basis of treatment & adverse effects of medications used in common psychiatric disorders like depression, psychosis, substance abuse, bipolar disorders, anxiety disorders, stress related disorders, psychosomatic disorders, personality disorders, somatoform disorders, psychosexual disorders, psychiatric disorders in children and elderly etc.
3. Enumerate the conditions for specialist referral with regard to common psychiatric disorders
4. Describe and discuss basic legal and ethical issues in psychiatry including the

knowledge of mental health care act, 2017

5. Describe the relevance and role of community psychiatry and discuss the objectives, strategies & contents of National Mental Health Program

B. Psychomotor Domain: - At the end of the course the student should be able to: -

1. Elicit and document the clinical features, interpret lab investigations in patients with common psychiatric disorders.
2. Demonstrate/perform mental status examination in simulated or patient encounters

C. Affective Domain: - All through the duration of the course, the student should be able to demonstrate: -

1. Demonstrate humane behaviour with mutual respect for each other - personal and professional.
2. Communicate effectively with teachers, technical staff, peers, patients during their learning activities.
3. Develop punctuality in attending academic sessions, submissions of records and assignments.
4. Demonstrate moral responsibility and accountability for their actions.
5. Demonstrate honesty and integrity in all learning activities
6. Developing rapport and empathy with patients and families
7. Maintaining confidentiality in patient encounters

8. Counsel and educate the family members of patients with common psychiatric disorders.

Teaching Learning Methods:

The university incorporates the guidelines of the CBME curriculum prescribed by the National Medical Commission (NMC). The department uses various innovative teaching learning methods to facilitate effective student learning.

Theory (Interactive lectures)	25 hours
Non-lecture teaching (small group teaching / tutorials / integrated learning / practical)	10 hours
Self-Directed Learning	05 hours
Clinical Postings	66 hours
Grand total	106

	hours

Log Book:

The psychiatry log book should be completed and evaluated by the faculty on a timely basis. The same to be certified by the head of the department at the end of the program before summative assessment.

Assessment methods:

The UG curriculum has no formal Formative Assessment/Summative Assessment for the subject of Psychiatry. However, at the end of teaching session/clinical postings MCQs are done as formative assessment.

Questions about common psychiatric conditions and topics will be prepared and sent to the Department of Medicine for including in their Formative Assessment.

Guidelines for Internal assessment:

Two internal assessments are planned and marks to be integrated with General Medicine in III MBBS part 1

Practical:

NA

Course outcomes:

Further to the learning goals and objectives, the outcome of training in Psychiatry should prepare the students to deliver preventive, promotive, curative and re-habilitative services for the care of patients both in the family and community and to refer advance cases to a specialized Psychiatry/Mental Hospital. Training should be integrated with the departments of Medicine, Neuro Anatomy, Behavioural Sciences and Forensic Medicine.

SYLLABUS

A. THEORY:

The following plan/schedule includes the topic under which each lecture class of 1 hour is to be taken, respective competencies it addresses, teaching learning and assessment methods. As there are two internal assessments which have to be carried out and marks to be integrated with General Medicine in III MBBS part 1, two hours have been kept aside for the same. Since the internal assessments have to be formative in nature, additional hours have been given for feedback.

No	Topic	Competencies	Time	T/L method	Assessment

1	Doctor patient relationship	• Components of communication • breaking bad news • importance of confidentiality PS1.2	1 hour	Lecture/ Small Group discussion	
2	Mental health	• Stress, components and cause • time-management, study skills, balanced diet, sleep wake cycle PS2.1, PS2.2	1 hour	Lecture/ Small Group discussion	
3	Mental health	• Components of memory, learning and emotions • Principles of personality development and motivation • Define and distinguish between normality and abnormality PS2.3, PS2.4, PS2.5	1 hour	Lecture/ Small Group discussion	
4	Introduction to psychiatry	• Growth, history, development of psychiatry as specialty • Brain and behaviour PS3.1	1 hour	Lecture/ Small Group discussion	
5	Introduction to psychiatry	• Signs and symptoms of common mental disorders • Biological, psychological and social factors and their interactions in causation of mental disorders • Distinguish psychotic and non-psychotic disorders PS3.2, PS3.6, PS3.12	1 hour	Lecture/ Small Group discussion	
6	Introduction to psychiatry	• Pharmacological basis and side-effects of drugs used in psychiatric disorders PS3.10	1 hour	Lecture/ Small Group discussion	

7	Substance Use disorders	• Magnitude & etiology • Treatment • Pharmacological basis and side-effects of drugs • Conditions for specialist referral PS4.1, PS4.4, PS4.6, PS4.7	1 hour	Lecture/ Small Group discussion	
8	Psychotic disorders	• Magnitude & etiology • Treatment • Pharmacological basis and side-effects of drugs • Conditions for specialist referral PS5.1, PS5.3, PS5.5, PS5.6	1 hour	Lecture/ Small Group discussion	
9	Depression	• Magnitude & etiology • Treatment • Pharmacological basis and side-effects of drugs • Conditions for specialist referral PS6.1, PS6.4, PS6.6, PS6.7	1 hour	Lecture/ Small Group discussion	
10	Bipolar disorders	• Magnitude & etiology • Treatment • Pharmacological basis and side-effects of drugs • Conditions for specialist referral PS7.1, PS7.4, PS7.6, PS7.7	1 hour	Lecture/ Small Group discussion	
11	Assessment & feedback	First Internal assessment	2 hours		Viva/ Theory/ MCQs
12	Anxiety disorders	• Magnitude & etiology • Treatment • Pharmacological basis and side-effects of drugs • Conditions for specialist	1 hour	Lecture/ Small Group discussion	

		referral PS8.1, PS8.4, PS8.6, PS8.7			
13	OCD	• Magnitude & etiology • Treatment • Pharmacological basis and side-1-hour effects of drugs • Conditions for specialist referral PS8.1, PS8.4, PS8.6, PS8.7	1 hour	Lecture/ Small Group discussion	
14	Stress related disorders	• Magnitude & etiology • Treatment • Pharmacological basis and side-effects of drugs • Conditions for specialist referral PS9.1, PS9.4, PS9.6, PS9.7	1 hour	Lecture/ Small Group discussion	
15	Personality disorders	• Magnitude & etiology • Treatment • Pharmacological basis and side-effects of drugs • Conditions for specialist referral PS11.1, PS11.4, PS11.6, PS11.7	1 hour	Lecture/ Small Group discussion	
16	Psychosexual and Gender Identity disorders (Psychosexual disorders)	• Magnitude & etiology • Treatment • Pharmacological basis and side-effects of drugs • Conditions for specialist referral PS13.1, PS13.4, PS13.6, PS13.7	1 hour	Lecture/ Small Group discussion	
17	Psychosexual and Gender Identity disorders (Gender	• Magnitude & etiology • Treatment • Pharmacological basis and side-effects of drugs • Conditions for specialist	1 hour	Lecture/ Small Group discussion	

	Identity disorders)	referral PS13.1, PS13.4, PS13.6, PS13.7			
18	Emotional & Behavioral problems in Child and Adolescence (ADHD, ODD, CD)	• Magnitude & etiology • Treatment • Pharmacological basis and side-effects of drugs • Conditions for specialist referral PS14.1, PS14.3, PS14.5, PS14.6	1 hour	Lecture/ Small Group discussion	
19	Other specific childhood psychiatric disorders (enuresis)	• Magnitude & etiology • Treatment • Pharmacological basis and side-effects of drugs • Conditions for specialist referral PS14.1, PS14.3, PS14.5, PS14.6	1 hour	Lecture/ Small Group discussion	
20	Psychiatric disorders in elderly	• Common psychiatric disorders including dementia, depression & psychosis • Magnitude & etiology • Therapy in elderly	1 hour	Lecture/ Small Group discussion	
		• Conditions for specialist referral PS16.1, PS16.2, PS16.3, PS16.5			
21	Psychiatric emergencies	• Describe recognition of psychiatric emergencies like suicide, deliberate self-harm and aggressive PS17.1, PS17.2, PS17.3	1 hour	Lecture/ Small Group discussion	
22	Therapeutics	• Describe principles of psychosocial interventions in psychiatric illness including psychotherapy, rehabilitation and behavioural therapy	1 hour	Lecture/ Small Group discussion	

		PS18.3			
23	Assessment & feedback	Second Internal assessment	2 hours		Viva/ Theory/ MCQs
Total			25 hours		

B. TUTORIALS/ INTEGRATED TEACHING/SEMINARS

The following plan/schedule includes the topics which needs integration with other subjects (The faculty of respective subjects either takes part in session in

person or gives inputs for the lesson plan). The topics suggested under tutorials/ seminars can be done in small groups as interactive lectures or seminars presented by students. The content under these topics are also to be considered in internal assessments. Again, these sessions have to be carried out in III MBBS part 1.

No	Topic	Competencies	Subject to be integrated with/ tutorials	Time	T/L method	Assessment
1	Introduction to psychiatry	- Enumerate, describe common psychiatric disorders, magnitude, etiology and clinical features in patients with organic psychiatric disorders - Essential investigations in patients with organic psychiatric disorders PS3.7, PS3.8	General Medicine	1 hour	Lecture/ Small Group discussion	

2	Alcohol and substance use disorders	• Magnitude and etiology of alcohol use disorders • Treatment of alcohol use disorders including pharmacotherapy and psychotherapy • Pharmacological basis and side-effects of drugs in alcohol use disorders • Appropriate conditions for specialist referrals in alcohol use disorders PS4.1, PS4.4, PS4.6, PS4.7	General Medicine	1 hour	Lecture/ Small Group discussion	
3	Psychosomatic disorders	• Magnitude and etiology of psychosomatic disorders • Treatment of psychosomatic disorders • Pharmacological basis of treatment and side-effects of psychosomatic disorders • Appropriate conditions for specialist referral PS12.1, PS12.4, PS12.6, PS12.7	General Medicine	1 hour	Lecture/ Small Group discussion	
4	Psychosomatic disorders	• Magnitude and etiology of psychosomatic disorders • Treatment of psychosomatic disorders • Pharmacological basis of treatment and side-effects of psychosomatic disorders • Appropriate conditions for specialist referral PS12.1, PS12.4, PS12.6, PS12.7	Dermatology	1 hour	Lecture/ Small Group discussion	

5	Mental retardation, scholastic backwardness, neurodevelopmental disorders, autism	• Magnitude & etiology • Intelligence quotient and assessment • Psychosocial treatments and interventions PS15.1, PS15.3, PS15.4	Pediatrics	1 hour	Lecture/ Small Group discussion	
6	Miscellaneous	• Relevance and role of community psychiatry • Objectives, strategies and contents of National Mental Health Program • Enumerate and describe salient features of MHCA 2017 • Describe the concept principles of preventive mental health promotion (positive mental health); and community education • Enumerate and describe the identifying features and the principles of participatory management of mental illness occurring during and after disasters PS19.1, PS19.2, PS19.4, PS19.5, PS19.6	Community Medicine	1 hour	Lecture/ Small Group discussion	Viva/ Theory/ MCQs
7	Miscellaneous	• Describe and discuss basic legal and ethical issues in psychiatry PS19.3, PS19.4	Forensic	1 hour	Lecture/ Small Group discussion	

8	Risk assessment for suicide	Enumerate and describe recognition of suicide risk in individuals PS17.1	Tutorials	1 hour	Small Group discussion	
9	ECT and other modalities like RTMS	- Indications of modified ECT - Indications of other modalities PS 18.2	Tutorials/ Seminar	1 hour	Small Group discussion	
10	Psychological assessments	PS 18.3	Tutorials/ Seminar	1 hour	Small Group discussion	
Total				10 hours	Viva/ Theory/ MCQs	

C. CLINICAL POSTINGS:

As per the Graduate Medical Education Regulations-2019, clinical postings in Psychiatry are accommodated as 2 weeks each in II MBBS and III MBBS part I. The total allocated teaching hours in these two phases for psychiatry is around 66 hours with **clinical postings in II MBBS occurring 15 hours per week (3 hours/day from Monday to Friday)** and that in III MBBS part I being 18 hours per week (3 hours/day from Monday to Saturday).

Clinical postings in II MBBS (Part A):

No	Topic	Competencies	Time*
1	Doctor patient relationship	● Developing rapport & empathy ● breaking bad news ● importance of confidentiality PS1.1, PS1.3, PS1.4, PS3.4	3 hours
2	Introduction to psychiatry	● Eliciting, presenting & documenting psychiatric history PS3.3	3 hours
3	Introduction to psychiatry	● Performing mental status examination PS3.5	3 hours
4	Alcohol use disorders	● Describe, elicit & document clinical features of alcohol use disorders ● Enumeration, describe and interpret laboratory investigations in such patients PS4.2, PS4.3	3 hours
5	Substance use disorders	● Describe, elicit & document clinical features of substance use disorders ● Enumeration, describe and interpret laboratory investigations in such patients PS4.2, PS4.3	3 hours
6	Psychotic disorders	● Describe, elicit & document clinical features in patients with psychotic disorders PS5.2	3 hours
7	Depression	● Describe, elicit & document clinical features in patients with depression ● Enumeration, describe and interpret	3 hours

		laboratory investigations in such patients ● Suicide risk assessment PS6.2, PS6.3	
8	Bipolar disorders	● Describe, elicit & document clinical features in patients with bipolar disorders ● Enumeration, describe and interpret laboratory investigations in such patients PS7.2, PS7.3	3 hours
9	Anxiety disorders (excluding OCD)	● Describe, elicit & document clinical features in patients with anxiety ● Enumeration, describe and interpret laboratory investigations in such patients PS8.2, PS8.3	3 hours
10	End of postings Assessment	With feedback	3 hours
Total			30 hours

Clinical postings in III MBBS part I (Part B):

No	Topic	Competencies	Time	Assessment
01	Organic psychiatry	- Enumerate, describe common psychiatric disorders, magnitude, etiology and clinical features in patients with organic psychiatric disorders - Essential investigations in patients with organic psychiatric disorders - Describe the steps and demonstrate in a simulated environment family education in patients with organic psychiatric disorders PS 3.7, 3.8 & 3.9	3 hours	
02	OCD	- Describe, elicit & document clinical history in patient with OCD - Enumeration, describe and interpret laboratory investigations in such patients PS8.2, PS8.3	3 hours	
03	Stress related/Dissociative disorders	- Describe, elicit & document clinical features of stress related/dissociative disorders - Enumeration, describe and interpret laboratory investigations in such patients PS9.2, PS9.3	3 hours	
04	Somatoform disorders	- Describe, elicit & document clinical features of somatoform disorders - Enumeration, describe and interpret laboratory investigations in such patients PS10.2, PS10.3	3 hours	

05	Personality disorders	- Describe, elicit & document clinical features of personality disorders - Enumeration, describe and interpret laboratory investigations in such patients PS11.2, PS11.3	3 hours	
06	Psychosomatic disorders	- Describe, elicit & document clinical features in patients with psychosomatic disorders - Enumeration, describe and interpret laboratory investigations in such patients PS12.2, PS12.3	3 hours	
07	Psychosexual and Gender Identity disorders	- Describe, elicit & document clinical features in patients with psychosexual and gender identity disorders - Enumeration, describe and interpret laboratory investigations in such patients PS13.2, PS13.3	3 hours	
08	Child and adolescent psychiatric disorders	- Describe, elicit & document clinical features in patients with child and adolescent psychiatric disorders - Enumeration, describe and interpret laboratory investigations in such patients PS14.2	3 hours	
09	Mental retardation	- Describe, elicit & document clinical history in child with mental retardation - Perform adequate physical examination in such children - Choose appropriate investigations	3 hours	

		in child with mental retardation PS15.4		
10	Psychiatric disorders in elderly	Perform family education in a patient with psychiatric disorders in elderly in a simulated environment PS16.4	3 hours	
11	Family education	Describe and demonstrate steps of family education in a simulated environment in a patient with following psychiatric disorders - Alcohol & substance use disorder - Schizophrenia - Depression - Bipolar disorder - Anxiety disorders - Stress related disorders - Somatoform disorders - Personality disorders - Psychosomatic disorders - Psychosexual and Gender identity disorders - Psychiatric disorders in childhood and adolescence - Elderly with psychiatric illnesses PS4.5, PS5.4, PS6.5, PS7.5, PS8.5, PS9.5, PS10.5, PS11.5, PS12.5, PS13.5, PS14.4, PS16.5	3 hours	
12	End of postings Assessment	With feedback	3 hours	OSCE, OSLER, DOPS, CBD
Total			36 Hours	

Curriculum for Radiation Oncology 2022



**Ramaiah Medical College
Ramaiah University of Applied Sciences
Bengaluru-560054**

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Department:**

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DEPARTMENT OF RADIATION
ONCOLOGY

Curricu
lum

The Department of Radiation Oncology with experienced and competent faculty enables the learning of the students even though the UG curriculum permits only 8-10 hours for the department. The department is well equipped with modern infrastructure such as Linear accelerator delivering 3DCRT, IMRT, IGRT, VMAT, SRT, SBRT and SRS as well as electron beam therapy on Teletherapy while Cobalt based HDR Brachytherapy unit delivering ICBT, ISBT, ILBT and Mould Brachy. The department also has IORT and PET CT.

The teaching faculties of Radiation Oncology are qualified and innovative. They are trained to impart quality education. The faculty have excelled in recent advances, research and innovative teaching methodology. The department also promotes student research program to inculcate the basic research methodology concepts.

This document provides the required guidelines to implement the CBME curriculum framed by National Medical Commission (NMC) for effective teaching-learning and evaluation of students.

Goal:

The broad goal of teaching the undergraduate medical students in the field of Radiotherapy is to make the students understand the magnitude of the ever-increasing cancer problem in the country. The students must be made aware about steps required for the prevention and possible cure of cancers.

Objectives:

The student at the end of the program should be able to

1. Identify symptoms and signs of various cancers and their steps of investigations and management.
2. Exhibit awareness of the principles of radiotherapy, the radio-responsiveness of various tumours and management of common cancers like cervical, breast and oral cancers.
3. Refer for further consultation at appropriate time without delay.
4. State general complications of irradiation and their management.
5. List common chemo-therapeutic drugs and toxicity of the same.
6. Implement health education programmes regarding prevention and early diagnosis of tobacco related cancers, cervical cancers, and breast cancers.
7. Know the general outlines of use of radio-isotopes in diagnosis and therapy
8. Be aware of the advances made in radiotherapy in cancer management and knowledge of various radio therapeutic equipment while treating a patient.

Teaching Learning Methods:

The university incorporates the guidelines of the CBME curriculum prescribed by the National Medical Commission (NMC). The department uses various innovative teaching learning methods to facilitate effective student learning.

Sl. No.	T-L Method	Number of Hours
1	Interactive Lectures	5
2	Group discussion	3
3	Visit to Department	2

Assessment methods:

Formative Assessment:

The UG curriculum has no FA/SA for the subject of Radiation Oncology. However, at the end of teaching session MCQs are done as formative assessment.

Questions about common cancers and radiation are prepared and sent to the department of surgery for including in their FA.

Guidelines for Internal assessment:

NA

Practical:

NA

SYLLABUS

1. Physical principles of radiotherapy.
2. Principles of chemotherapy.
3. Prevention of cancer.
4. Early diagnosis of cancer.
5. Principles of nuclear medicine.
6. Radio responsiveness of various tumors and management.
7. Common radiation reactions and management.
8. Radiotherapy in some of the commonly seen cancers.
9. Chemotherapy in certain cancers like childhood tumors, leukemia and lymphomas.
10. Radio-isotopes in diagnosis and therapy.

Subject :- Radiation Oncology

Allotted hours :- 8 to 10

Mode of teaching:- lecture ,SDL ,Department visit

PROGRAMME OUTCOME

1. Be aware of causes of cancer and various available investigations to stage of disease
2. Be competent in identifying early signs of cancer and refer the patients to an oncologist.
3. Appreciate the social, cultural, economic and environmental factors associated with the diagnosis of cancer.
4. Demonstrate leadership skills in coordinating among various specialists for effective management of cancer

PROGRAMME SPECIFIC OUTCOME

1. Exhibit awareness of increasing incidence of cancer.
2. Understand various national cancer control programmes and implement screening methods for Breast, cervical and Head & Neck cancers.
3. Implement health education programme regarding tobacco & HPV related cancers.
4. Exhibit awareness of basic principles of radiation, advances in techniques and toxicities.

5. Outline the treatment for cervical, breast and H & N cancer.



Curriculum for Radiology 2022



**Ramaiah Medical College
Ramaiah University of Applied Sciences
Bengaluru-560054**

UG CURRICULUM

RADIODIAGNOSIS

(CODE: RD)

Introduction:

Radiodiagnosis is pivotal in management of patients. It is a branch of medicine that utilizes various imaging techniques such as radiography, sonography, computed tomography, nuclear magnetic resonance imaging etc. for diagnosis of disease. It deals not only with imaging the diseases but also with therapeutic interventions for treatment.

The Department of Radiodiagnosis with experienced and competent faculty enables the learning of the students through a robust curriculum. The department is equipped with state of art high end diagnostic machines including six radiography units, eleven mobile X-ray units, two radiography units with IITV imaging / Fluoroscopy, six mobile C – arm units, one 64 slice and one 16 slice CT unit, one 1.5 T and another upcoming 3T MRI unit, one mammography unit, six ultrasonography units, three portable ultrasonography units, PACS with standard workstations.

On a daily basis, ~150 Ultrasound scans, 400 Radiographs, 50 CT scans, 25 MRI scans are performed along with mammograms, special radiographic procedures, angiograms and image guided interventions.

Over the time we aim to subspecialize in musculoskeletal imaging, fetal medicine, cardiac imaging and interventional radiology.

The teaching faculty is experienced and competent. They are trained to impart quality education and have excelled in recent advances, research and innovative teaching methodology.

This document provides the required guidelines to implement the CBME curriculum framed by National Medical Commission (NMC) for effective teaching-learning and evaluation of students.

The undergraduate students will be able to study the Elective modules which will be introduced in the new academic year. Twelve theory classes are conducted as per the competencies described in NMC guidelines for sixth term students. There are clinical orientation classes for two weeks each for third and sixth term students.

TEACHING LEARNING METHODS

The university incorporates the guidelines of the CBME curriculum prescribed by the National Medical Commission (NMC). The department uses various innovative teaching learning methods to facilitate effective student learning.

Sl. No.	T-L Method	Number of Hours
I	Interactive Lectures	10

2	Group discussion	2
3	Clinical posting to department (3 rd and 6 th term)	12 each

ASSESSMENT METHODS

Formative Assessment:

The UG curriculum has no FA/SA for the subject of Radiation Oncology. However, at the end of teaching session MCQs are done as formative assessment.

Questions about common cancers and radiation are prepared and sent to the department of surgery for including in their FA.

Guidelines for Internal assessment: NA

Practical: NA

Course / program outcome

- Student should be able to identify and read a normal chest x-ray.
- Student should know the specific radiological investigation required for a patient based on the clinical diagnosis.
- Students should be able to know the prerequisite for any given radiological investigation.
- Students should be able to identify acute conditions on CT / MRI.

SYLLABUS

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
RADIODIAGNOSIS									
Topic: Radiological investigations and Radiation safety		Number of competencies: (13)			Number of procedures that require certification: (NIL)				
RD1.1	Define radiation and the interaction of radiation and importance of radiation protection	K	KH	Y	Lecture, Demonstration				
RD1.2	Describe the evolution of Radiodiagnosis. Identify various radiological equipments In the current era	S	SH	Y	Lecture, Demonstration				
RD1.3	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining todisorder of ENT	K/S	SH	Y	Lecture, Demonstration				
RD1.4	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining todisorder in Ob & Gy	K/S	SH	Y	Lecture, Demonstration				
RD1.5	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining todisorder in internal medicine	K/S	SH	Y	Lecture, Demonstration				
RD1.6	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining todisorderls in surgery	K/S	SH	Y	Lecture, Demonstration				
RD1.7	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining todisorder in Pediatrics	K/S	SH	Y	Lecture, Demonstration				

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
RD1.8	Enumerate indications for various common radiological investigations, choose the most appropriate and cost effective method and interpret findings in common conditions pertaining tocommon malignancies	K/S	SH	Y	Lecture, Demonstration				
RD1.9	Describe the role of Interventional Radiology in common clinical conditions	K	KH	Y	Lecture, Demonstration				
RD1.10	Describe the role of Emergency Radiology, miscellaneous & applied aspects, interaction with clinical departments	K	KH	Y	Lecture, Demonstration				
RD1.11	Describe preparation of patient for common imaging procedures	K	KH	Y	Lecture, Demonstration				
RD1.12	Describe the effects of radiation in pregnancy and the methods of prevention/ minimization of radiation exposure	K	KH	Y	Lecture, Demonstration				
RD1.13	Describe the components of the PC & PNDT Act and its medicolegal implications	K	KH	Y	Lecture, Small group discussion			Obstetrics & Gynaecology, Forensic Medicine & Toxicology	
	Column C: K- Knowledge, S – Skill, A - Attitude / professionalism, C- Communication. Column D: K – Knows, KH - Knows How, SH - Shows how, P- performs independently, Column F: DOAP session – Demonstrate, Observe, Assess, Perform. Column H: If entry is P: indicate how many procedures must be done independently for certification/ graduation								
Integration									
Human Anatomy									
AN13.4	Identify the bones and joints of upper limb seen in anteroposterior and lateral view radiographs of shoulder region, arm, elbow, forearmand hand	K/S	SH	Y	Practical, Small group discussion, DOAP session	Viva voce/ Skill assessment		Radiodiagnosis	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
AN20.6	Identify the bones and joints of lower limb seen in anteroposterior and lateral view radiographs of various regions of lower limb	K/S	SH	Y	Lecture, Small group discussion, DOAP session	Viva voce/ Skill assessment		Radiodiagnosis	
AN25.7	Identify structures seen on a plain x-ray chest (PA view)	K/S	SH	Y	Practical, DOAP session	Written/ Viva voce		Radiodiagnosis, General Medicine	
AN25.8	Identify and describe in brief a barium swallow	K/S	SH	N	Practical, DOAP session	Written/ Viva voce		Radiodiagnosis, General Medicine	
AN43.7	Identify the anatomical structures in 1) Plain x ray skull, 2) AP view and lateral view 3) Plain x ray cervical spine - AP and lateral view 4) Plain x ray of paranasal sinuses	K/S	SH	Y	Practical	Viva voce/ Skill assessment		Radiodiagnosis	
AN43.8	Describe the anatomical route used for carotid angiogram and vertebral angiogram	K/S	SH	N	Practical	Viva voce/ Skill assessment		Radiodiagnosis	
AN43.9	Identify anatomical structures in carotid angiogram and vertebral angiogram	K/S	SH	N	Practical	Viva voce/ Skill assessment		Radiodiagnosis	
AN51.1	Describe & identify the cross-section at the level of T8, T10 and L1 (transpyloric plane)	K/S	SH	Y	Practical, Lecture, Small group discussion, DOAP session	Written/ Viva voce/ Skill assessment		Radiodiagnosis	
AN51.2	Describe & identify the midsagittal section of male and female pelvis	K	SH	Y	Practical, Lecture, Small group discussion, DOAP session	Written/ Viva voce/ Skill assessment		Radiodiagnosis	
AN54.1.	Describe & identify features of plain X ray abdomen	K/S	SH	Y	Lecture, DOAP session	Viva voce/ Skill assessment		Radiodiagnosis	
AN54.2	Describe & identify the special radiographs of abdominopelvic region (contrast X ray Barium swallow, Barium meal, Barium enema, Cholecystography, Intravenous pyelography & Hysterosalpingography)	K/S	SH	Y	Lecture, DOAP session	Viva voce/ Skill assessment		Radiodiagnosis	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
AN54.3	Describe role of ERCP, CT abdomen, MRI, Arteriography in radiodiagnosis of abdomen	K	KH	N	Lecture	Viva voce		Radiodiagnosis	
Forensic Medicine & Toxicology									
FM1.9	Describe the importance of documentation in medical practice in regard to medicolegal examinations, Medical Certificates and medicolegal reports especially: -- maintenance of patient case records, discharge summary, prescribed registers to be maintained in Health Centres. -- maintenance of medico-legal register like accident register. -- documents of issuance of wound certificate -- documents of issuance of drunkenness certificate. -- documents of issuance of sickness and fitness certificate. -- documents for issuance of death certificate. -- documents of Medical Certification of Cause of Death - Form Number 4 and 4A -- documents for estimation of age by physical, dental and radiological examination and issuance of certificate	K	KH	Y	Lecture/ Small group discussion	Written/ Viva voce		Radiodiagnosis, General Surgery, General Medicine, Pediatrics	
General Medicine									
IM1.19	Enumerate the indications for and describe the findings of heart failure with the following conditions including: 2D echocardiography, brain natriuretic peptide, exercise testing, nuclear medicine testing and coronary angiogram	S	KH	N	Lecture, Small group discussion, Bedside clinic	Skill assessment		Radiodiagnosis	
IM3.7	Order and interpret diagnostic tests based on the clinical presentation including: CBC, Chest X ray PA view, Mantoux, sputum gram stain, sputum culture and sensitivity, pleural fluid examination and culture, HIV testing and ABG	S	SH	Y	Bedside clinic, DOAP session	Skill assessment		Radiodiagnosis, Microbiology	
IM3.11	Describe and enumerate the indications for further testing including HRCT, Viral cultures, PCR and specialised testing	S	SH	Y	Bedside clinic, DOAP session	Skill assessment		Radiodiagnosis, Microbiology	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
IM5.13	Enumerate the indications for ultrasound and other imaging studies including MRCP and ERCP and describe the findings in liver disease	K	K	Y	Bedside clinic, Small group discussion	Viva voce/ Written		Radiodiagnosis	General Surgery
IM6.12	Enumerate the indications and describe the findings for CT of the chest and brain and MRI	K	K	N	Small group discussion, Lecture, Bedside clinic	Written/ Viva voce		Radiodiagnosis	
IM7.18	Enumerate the indications and interpret plain radiographs of joints	K	SH	Y	Bedside clinic, Small group discussion	Skill assessment/ Written		Radiodiagnosis	Orthopedics
IM10.19	Enumerate the indications and describe the findings in renal ultrasound	K	KH	N	Lecture, Small group discussion	Written/ Viva voce		Radiodiagnosis	
IM13.12	Describe the indications and interpret the results of Chest X Ray, mammogram, skin and tissue biopsies and tumor markers used in common cancers	K	KH	Y	Bedside clinic, Small group discussion	Short note/ Viva voce		Radiodiagnosis	
IM18.9	Choose and interpret the appropriate diagnostic and imaging test that will delineate the anatomy and underlying cause of the lesion	S	KH	Y	Bedside clinic, DOAP session, Small group discussion	Written/ Viva voce/ Skill assessment		Radiodiagnosis	
IM19.7	Choose and interpret diagnostic and imaging tests in the diagnosis of movement disorders	S	SH	Y	Bedside clinic, Small group discussion	Skill assessment/ Small group session/ Written/ Viva voce		Radiodiagnosis	
Obstetrics & Gynaecology									
OG9.4	Discuss the clinical features, laboratory investigations, ultrasonography, differential diagnosis, principles of management and follow up of gestational trophoblastic neoplasms	K	KH	Y	Lecture, Small group discussion	Written/ Viva voce			Radiodiagnosis
Pediatrics									
PE21.12	Interpret report of Plain radiograph of KUB	S	SH	Y	Bedside clinics, Skills lab	Log book		Radiodiagnosis	

Number	COMPETENCY The student should be able to	Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P	Vertical Integration	Horizontal Integration
PE21.13	Enumerate the indications for and Interpret the written report of Ultra sonogram of KUB	S	SH	Y	Bedside clinics, Skills lab	Log book		Radiodiagnosis	
PE23.13	Interpret a chest radiograph and recognize Cardiomegaly	S	SH	Y	Bedside clinics, Skills lab	Log book entry		Radiodiagnosis	
PE23.16	Use the ECHO reports in management of cases	S	SH	Y	Bedside clinics	Log book entry		Radiodiagnosis	
PE28.17	Interpret X-ray of the paranasal sinuses and mastoid; and /or use written report in case of management Interpret CXR in foreign body aspiration and lower respiratory tract infection, understand the significance of thymic shadow in Pediatric chest X-rays	S	P	Y	Bedside clinics, Small group discussion	Skills Assessment	3	ENT, Radiodiagnosis	
PE30.23	Interpret the reports of EEG, CT, MRI	S	SH	Y	Bedside clinics, Skills lab	Log book		Radiodiagnosis	
PE34.8	Interpret a Chest radiograph	S	SH	Y	Bedside clinics, Skills lab	Skill assessment		Radiodiagnosis	Respiratory Medicine
General Surgery									
SU25.3	Describe the etiopathogenesis, clinical features, Investigations and principles of treatment of benign and malignant tumours of breast.	K	KH	Y	Lecture, Small group discussion, Demonstration	Written/ Viva voce Skill assessment		Radiodiagnosis	



Curriculum for Respiratory Medicine 2022



**Ramaiah Medical College
Ramaiah University of Applied
Sciences
Bengaluru-560054**

Introduction to the Department:

Respiratory Medicine is a branch that deals with diseases of the Respiratory tract.

The department of Respiratory medicine with experienced and competent faculty enable learning of the students through a structured didactic lectures and bedside clinical based curriculum. The department consists of Outpatient area, In patient wards, Isolation wards, Respiratory Intensive care unit (RICU), Multidrug Resistant TB ward, Procedure rooms, Seminar hall and departmental library.

Department also has national Tuberculosis Elimination programme (NTEP) under which free treatment is offered to patients with tuberculosis.

Department is well equipped with facilities such as spirometry, DLCO, Bronchoscopy, Pleuroscopy, Endo Bronchial Ultrasound (EBUS) and Polysomnography (Complete and Limited).

Department also utilizes the facilities at advance learning center to teach students about clinical examination of respiratory system.

Teaching faculty of Respiratory Medicine Department are well qualified and competent in their specialty. They are trained to impart quality education. The faculty are actively involved in research and innovative teaching methodology. Department also promotes student research programme to inculcate basic research methodology concepts.

This document provides the required guidelines to implement the CBME curriculum , framed by National medical Commission (NMC) for effective teaching learning and evaluation of students.

Goal:

The main purpose of teaching diseases related to respiratory system is to enable the students to identify , diagnose , and treat pulmonary diseases , take preventive and curative steps for these diseases in the community at all levels of health care.

Objectives:

Students at the end of the course should be able to

1. Obtain theoretical knowledge of different aspects of respiratory medicine including the status in health and diseases.
 2. Acquire clinical skills
 3. Acquire bedside procedure skills
 4. Management of emergencies
 5. Participation in research and conference presentation.
- These involve patient management in Out patient , In patient , Case presentation , Didactic lectures , Seminars and Self directed learning (SDL).

Integrated teaching:

1. **Anatomy** : Early Clinical exposures: (ECS)-Observation of "Examination of Respiratory System' for MBBS Phase I

Objectives:(Observation of the examination done by the doctor)

- a. Interpretation of vital signs with respect to respiratory system
- b. Inspection of the patient's breathing pattern
- c. Skin color and respiratory status
- d. Palpation to identify chest abnormalities
- e. Percussion of the lung fields
- f. Auscultation of lung sounds using a stethoscope.

2. **Physiology** : Early Clinical exposures: (ECS) for MBBS Phase I

Objectives:

- a. To observe clinical examination of respiratory system in hospital setting.

- b. To observe recording of spirometry and to learn the interpretation.

Subject Specific Competencies

By the end of the course, the student should have acquired

1. Knowledge (cognitive domain)
2. Professionalism (affective domain)
3. Skills (psychomotor domain)

1. Cognitive domain

At the end of the Under graduate course , the students should be able to:

1. Demonstrate sound knowledge of common pulmonary diseases, their clinical manifestations, including emergent situations and investigations to confirm the diagnosis. A comprehensive knowledge of epidemiological aspects of pulmonary diseases should be acquired.
2. Demonstrate comprehensive knowledge of various modes of therapy used in treatment of pulmonary diseases.
3. Describe the mode of action of commonly used drugs, their doses, side-effects / toxicity, indications, contra-indications and interactions.
4. Describe commonly used modes of management including medical and surgical procedures available for treatment of various diseases and to offer a comprehensive plan of management inclusive of National Tuberculosis Elimination Programme.
5. Recognize the national priorities in pulmonary medicine and play an important role in the implementation of National Health Programmes including tuberculosis.
6. Demonstrate competence in medical management.
7. Should inculcate good reading habits and develop ability to search medical literature and develop basic concept of medical research.

2. Psychomotor domain

At the end of the course, the student should acquire following clinical skills and be able to:

1. Elicit relevant and correct information and describe the history in chronological order.
2. Conduct clinical examination, elicit and interpret clinical findings , diagnose common pulmonary disorders and emergencies.
3. Observe simple, routine investigative and office procedures required for making the bedside diagnosis like sputum collection and examination for etiologic organisms especially Acid Fast bacilli(AFB), interpretation of the chest x-rays and lung function tests.
4. Develop management plans for various pulmonary diseases.
5. Observe the performance of common procedures, like bronchoscopy, pleural aspiration, intercostal tube insertion and drainage.

3. Affective Domain:

1. Demonstrate humane behavior with mutual respect for each other - personal and professional.
2. Communicate effectively with teachers, technical staff, peers and patients.
3. Develop punctuality in attending academic sessions and

assignments.

4. Demonstrate moral responsibility and accountability for their actions.
5. Demonstrate honesty and integrity in all learning activities.
6. Respect the confidentiality of patient and their diseases.

Teaching Learning Methods:

The university incorporates the guidelines of the CBME curriculum prescribed by the National Medical Commission (NMC). The department uses various innovative teaching learning methods to facilitate effective student learning.

Sl. No.	T-L Method	Number of Hours
1	Interactive Lectures	8
2	Small Group Learning Tutorials Visit to hospital OPDs and Wards Problem based Learning for Integrated sessions Observation of procedures performed in the department ALC visits Seminars videos/simulation	33 2 7
3	Early Clinical Exposure	4 hours
4	Self-Directed Learning	2

Formative Assessment:

Lectures : Multiple choice questions at the end of all lectures – 5 marks each.

Clinical : Bedside case presentation – History taking at the end of the clinical posting- 25 marks(
For discussion . Marks to be included in Internal Medicine)

Recommended Books:

1. Davidson's principles and practice of Medicine
2. Crofton & Dougla's Respiratory diseases
3. Toman's Tuberculosis-WHO

4. A Textbook of symptoms and physical signs Physical diagnosis by Vakil and Golwalla
5. Macleod's Clinical Examination
6. Hutchison's clinical methods

Syllabus:

Term: MBBS PHASE III PART I

Sl. No	Competency No.	Competencies
1	CT1.5,1.6,2.9	Introduction to Respiratory system ,Anatomy and examination
2	CT1.7,1.9,1.10,1.11,1.12,2.14.	Investigation for Respiratory Diseases –CBC, Mantoux , Sputum C/S Pleural fluid examination and C/S , HIV testing , ABG
3	CT1.9,2.14.	Interpretation of Chest X-ray
4	CT.2.13,PY6.8	Spirometry and devices in Respiratory Medicine
5	CT:1.1,1.2,1.3,1.4,1.5,1.6,1.7.	Pulmonary Tuberculosis(epidemiology , microbiology , pathogenesis , co infection with HIV and comorbidities like DM etc)
6	CT:1.9,1.10,1.1,1.12,PE:34.2	Pulmonary Tuberculosis- Diagnostic Tools
7	CT:1.13,1.14,1.17,PH:1.44.3.19	BCG Vaccine , Pharmacology , anti tubercular agents
8	CT:1.4,2.18,2.19,2.24,PH1.45.	Atypical Mycobacteria and MDR-TB
9	IM3.1,3.2,3.3,3.15,3.17,3.18,PA26.1	Community acquired Pneumonia
10	PA26.2	Lung abscess
11	CT1.15,1.16,1.17,1.18,1.19	NTEP
12	IM 7.3,7.4,7.5	Sarcoidosis
13	CT:2.1,2.2,2.3,2.4,2.5,2.6,2.7, 2.13,2.14,2.15,2.16,2.17,2.18,2.19, 2.24,2.25,2.26,PH1.33.	OAD-causes ,pathophysiology , diagnostic work up and interpretation. Treatment of OAD –therapeutic plan
14	PA26.2,26.3.	BRONCHIECTASIS
15	CT2.18,2.19,2.24,2.1-2.7, 2.25,2.26,PH:1.33 , IM:24.1	COPD –causes , pathophysiology,diagnostic tests and interpretation ,Therapeutic plan , oxygen therapy , smoking Cessation , Indication for vaccination
16	CT1.15,1.16,1.17,1.18,1.19	NTEP
17		PLEURAL EFFUSION SDL
18		PNEUMOTHORAX SDL
19		SLEEP RELATED BREATHING DISORDERS

TERM: MBBS Phase II BLOCK II clinical posting

Sl. No	Competency No.	Competencies
1	CT:1.5	History taking: Elicit and present appropriate medical history of respiratory system in General
2	CT:1.5	Approach to respiratory system examination , risk factors, symptoms including cough and fever, CNS and other manifestations
3	CT:1.6	Perform a general examination that establishes the diagnosis based on clinical presentation
4	CT:1.6,CT:1.6,2.9	Systemic examination –examination of chest , lung(loss of volume , mediastinal shift), Systemic examination- percussion , auscultation, lymphatic system and CNS examination
5	CT:2.8-2.18	Approach to Bronchial Asthma-Aetiologies , severity and precipitants, diagnostic work up and therapeutic plan
6	CT:2.18,2.19,2.24	Other Obstructive Airway disease-therapeutic and management plan
7	CT:1.5,1.6,1.8,1.9	Approach to Tuberculosis-history, examination, screening, diagnostic tests, DOTS
8	CT:2.11,2.12,2.13	Spirometry and other devices-perform and interpret.
9	CT:1.9,2.14	Diagnostic tools-CBC, Chest X-ray, Mantoux , sputum culture and sensitivity pleural fluid examination and c/s , HIV testing, pulse oximetry , ABG

DEPARTMENT OF RESPIRATORY MEDICINE

Internship

SKILLS TO BE ACQUIRED

- Ability to elicit proper history
- Conduct clinical examination and diagnose common respiratory diseases
- Interpret Chest X Ray
- Proper usage of Inhaler devices
- Assist procedures like Pleural aspiration and ICD tube insertion
- Sputum collection and examination
- Basic understanding of NTEP

GOOD TO KNOW SKILLS

- Interpretation of Spirometry

METHODS TO TRAIN

- Visit to ALC – to learn identification of abnormal breath sounds and adventitious sounds
- Bedside case discussion
- Perform the PFT manoeuvre
- Assist in procedures like Pleural aspiration and ICD tube insertion

ASSESSMENT METHODS

- Case presentation
- Viva- Spotters

LEARNING OUTCOMES FOR INTERNS

Comments and Suggestions:

NO.	Learning outcome	Strongly Agree 5	Agree 4	Uncertain 3	Disagree 2	Strongly Disagree 1
1.	I am capable of diagnosing common respiratory disorders.					
2.	I have acquired the skill to elicit clinical history and conduct a general physical examination.					
3.	I have acquired the skill to conduct examination of Respiratory system and Interpret findings.					
4.	I have visited ALC					
5.	I have basic understanding of spirometry maneuver and the use of devices used for management of bronchial Asthma and COPD					
6.	I have basic understanding of NTEP					

Course outcome : At the end of the undergraduate course student should be able to

- Obtain theoretical knowledge of different aspects of respiratory medicine including the status in health and diseases.
- Demonstrate sound knowledge of common pulmonary diseases, their clinical manifestations, including emergent situations and investigations to confirm the diagnosis.
- A comprehensive knowledge of epidemiological aspects of pulmonary diseases should be acquired
- Acquire clinical skills- elicit relevant and correct information and describe the history in chronological order, conduct clinical examination, elicit and interpret clinical findings and diagnose common respiratory disorders and emergencies. Manage common diseases recognizing the need for referral for specialized care in case of inappropriateness of therapeutic response.

- Demonstrate comprehensive knowledge of various modes of therapy used in the treatment of respiratory diseases, describe the mode of action of commonly used drugs, their doses, side effects/toxicity, indications, contraindications and drugs interactions
- Acquire bedside procedure skills- perform simple, routine investigative and office procedures required for making the bedside diagnosis, interpretation of chest x rays and spirometry manoeuver.
- Assist and perform common procedures like pleural aspiration. Observe the performance of common procedures like bronchoscopy, intercostal tube insertion and drainage.
- Recognize the national priorities in pulmonary medicine and play an important role in the implementation of National Health Programmes including tuberculosis(NTEP).



Curriculum for General Surgery 2022



**Ramaiah Medical College
Ramaiah University of Applied Sciences
Bengaluru-560054**

INTRODUCTION OF DEPARTMENT

DEPARTMENT OF GENERAL SURGERY

CURRICULUM

Surgery remains the corner stone for final execution of management protocol and plan optimal treatment for surgical conditions. In depth understanding of pathophysiology, natural history of disease and its manifestations, clinical symptoms and sign is essential along with appropriate investigations and its interpretations for management of surgical conditions.

Developing optimal knowledge with critical analysis and also understanding the variability of clinical presentation is cardinal in arriving to an appropriate diagnosis. Acquiring surgical acumen and skills in arriving to diagnosis and planning optimal surgical care is vital in the comprehensive health care delivery by an Indian medical graduate.

The department of surgery with its competent and expert faculty in various facets of surgical expertise could enable the students in acquiring knowledge and desirable skills with focused training towards critical analysis and possessing optimal psychomotor skills.

Being a tertiary hospital catering to a large population and availability of substantial clinical material have enabled us for focussed bed side clinics, OPD exposure with one minute preceptors (OMP), demonstration of outpatient procedures and problem based learning scenarios.

State of art and highly advanced centre of excellence (A.L.C) is utilised for U.G psychomotor skill development by periodically posting students in various phases of their curriculum with planned and well-designed curricula to train as well as to assess the skill competency acquired.

Demonstration and on table discussion of live procedures with the operating surgeon with the aid of T.V. monitors in the O.T. complex has been efficiently adopted to enhance the interactive learning.

Simulations developed indigenously as well as acquired at A.L.C have been implemented in learning specialised psychomotor skills.

Regular C.M.E and workshops have been held by the department for U.G. students and interns as value added departmental activity.

One of the best practices of the institution is surgical skill training programme and laparoscopy cadaver training catering to undergraduate (Insight), interns, postgraduate (C.S.E.P) and faculty national and international workshops has been adopted efficiently.

The department also caters Ramaiah outreach peripheral hospitals (RNPH, RLH, R Harsha) and actively participate in community outreach medical camps organised through our esteemed institution.

GOAL:

The main purpose of teaching surgery is to enable the medical graduate to acquire adequate knowledge of various surgical conditions and develop psychomotor skills in surgery optimal enough to serve the society and focus towards delivery of best surgical care.

Undergraduate students in surgery capable of delivering first contact surgical care.

S C O - Specific course outcomes

- 1) Explain the causes, pathogenesis, diagnosis and management of common surgical problems in adults and children.
- 2) To know practise of asepsis, disinfection and sterilization, universal precautions with sound knowledge of rational use of antibiotics.
- 3) Explain various common malignancies in the country along with detection, prevention and management outlines.
- 4) List the areas, techniques of anaesthesia along with common agents used with their indications and outcomes
- 5) Recognise, Stabilise and treatment of common surgical emergencies including trauma care, along with delivery of basic and advanced life support for patients
- 6) Able to perform both diagnosis and basic surgical procedures at primary care level with recognition of need of referral to higher centres.
- 7) Ability to counsel patient and patient attenders regarding informed consent and counselling regarding surgery.

Objectives:

The student at the end of the program should be able to

Cognitive Domain:

- (1) describe aetiology, pathophysiology, principles of diagnosis and management of common surgical problems including emergencies, in adults and children;
- (2) define indications and methods for fluid and electrolyte replacement therapy including blood transfusion;
- (3) define asepsis, disinfection and sterilization and recommend judicious use of antibiotics;
- (4) describe common malignancies in the country and their management including prevention;
- (5) enumerate different types of anaesthetic agents, their indications, mode of administration, contra indications and side effects.

Psychomotor Domain:

- (1) diagnose common surgical conditions both acute and chronic, in adult and children;
- (2) plan various atory tests for surgical conditions and interpret the results;
- (3) identify and manage patients of haemorrhagic, septicemic and other types of shock,
- (4) be able to maintain patent air-way and resuscitate.
 - (i) a critically injured patient;
 - (ii) patient with cardio-respiratory failure;
 - (iii) a drowning case;
- (5) monitor patients of head, chest, spinal and abdominal injuries, both in adults and children;

- (6) provide primary care for a patient of burns;
- (7) In the situations identified in Sl. No: 3, 4, 5, and 6, calling for urgent or early surgical intervention, refer at the optimum time to appropriate centres;
- (8) acquire principles of operative surgery, including pre-operative, operative and post operative care and monitoring;
- (9) treat open wounds including preventive measures against tetanus and gas gangrene;
- (10) diagnose neonatal and paediatric surgical emergencies and provide sound primary care before referring the patient to secondary/tertiary centers;
- (11) identify congenital anomalies and refer them for appropriate management

In addition to the skills referred above in items (1) to (10), he shall have observed/assisted/performed the following:

- (a) Incision and drainage of abscess;
- (b) Debridement and suturing open wound;
- (c) Venesection;
- (d) Excision;
- (e) Biopsy of surface malignancy;
- (f) Catheterisation and nasogastric intubation;
- (g) Circumcision;
- (h) Meatotomy;
- (i) Vasectomy;
- (j) Peritoneal and pleural aspirations;
- (k) Diagnostic proctoscopy;
- (l) Hydrocele operation;
- (m) Endotracheal intubation;
- (n) Tracheostomy and cricothyroidotomy;
- (o) Chest tube insertion.

Affective Domain:

1. Demonstrate humane behaviour with mutual respect for each other - personal and professional.
2. Communicate effectively with teachers, technical staff, peers, patients during their learning activities.
3. Develop punctuality in attending academic sessions, submissions of records and assignments.
4. Demonstrate moral responsibility and accountability for their actions.
5. Demonstrate honesty and integrity in all learning activities.
6. counsel and guide patients and relatives regarding need, implications and problems of surgery in the individual patient;
7. develop adequate and right attitude in dealing with surgical problems of patients;
8. organize and conduct relief measures in situations of mass casualties.
9. discharge effectively medico-legal and ethical responsibilities.

Competencies in surgery				
No.	Topic	Competencies	Core	Non-Core
1	Metabolic response to injury	3		
2	Shock	3		
3	Blood and blood components	3		
4	Burns	4		
5	Wound healing and wound care	4		
6	Surgical infections	2		
7	Surgical Audit and Research	2		
8	Ethics	3		
9	Investigation of surgical patient	3		
10	Pre, intra and post- operative management.	4		
11	Anaesthesia and pain management	6		
12	Nutrition and fluid therapy	3		
13	Transplantation	4		
14	Basic Surgical Skills	4		
15	Biohazard disposal	1		
16	Minimally invasive General Surgery	1		
17	Trauma	10		
18	Skin and subcutaneous tissue	3		
19	Developmental anomalies of face, mouth and jaws	2		
20	Oropharyngeal cancer	2		
21	Disorders of salivary glands	2		
22	Endocrine General Surgery: Thyroid and parathyroid	6		
23	Adrenal glands	3		
24	Pancreas	3		
25	Breast	5		
26	Cardio-thoracic General Surgery- Chest - Heart and Lungs	4		
27	Vascular diseases	8		
28	Abdomen	18		
29	Urinary System	11		
30	Penis, Testis and scrotum	6		

SL.NO	Competency number	Competency
1	SU1.1	Define homeostasis and discuss concepts of homeostasis. Enlist the metabolic changes in injury and mediators responsible for it.
2	SU1.2	Enumerate and discuss the factors that affect metabolic response to injury
3	SU1.3	Discuss concepts of preoperative and postoperative care
4	SU2.1	Define shock Describe pathophysiology of shock Discuss types of shock and principles of resuscitation including fluid replacement and monitoring
5	SU2.2	Describe symptoms, signs and appropriate treatment of shock
6	SU2.3	Counsel patients and families regarding treatment and prognosis of shock
7	SU3.1	Discuss the indications, appropriate use of blood and blood products and complications of blood transfusion
8	SU3.2	Monitor blood transfusion
9	SU3.3	Counsel patients and family/ friends regarding blood transfusion and blood donation
10	SU4.1	Elicit document and present history in a case of Burns and perform physical examination. Describe Pathophysiology of Burns.
11	SU4.2	Describe Clinical features, Diagnose type and extent of burns and plan appropriate treatment.

12	SU4.3	Discuss the Medicolegal aspects in burn injuries.
13	SU4.4	Communicate and counsel patients and families on the outcome and rehabilitation demonstrating empathy and care.
14	SU5.1	Describe normal wound healing and factors affecting healing.
15	SU5.2	Elicit, document and present a history in a patient presenting with wounds.
16	SU5.3	Differentiate the various types of wounds, plan and observe management of wounds.
17	SU5.4	Discuss medico legal aspects of wounds
18	SU6.1	Define and describe the aetiology and pathogenesis of surgical Infections
19	SU6.2	Enumerate Prophylactic and therapeutic antibiotics Plan appropriate management
20	SU7.1	Describe the Planning and conduct of Surgical audit
21	SU7.2	Describe the principles and steps of clinical research in General Surgery
22	SU8.1	Describe the principles of Ethics as it pertains to General Surgery
23	SU8.2	Demonstrate Professionalism and empathy to the patient undergoing General Surgery
24	SU8.3	Discuss Medico-legal issues in surgical practice
25	SU9.1	Choose appropriate biochemical, microbiological, pathological, imaging investigations and interpret the investigative data in a surgical patient
26	SU9.2	Biological basis for early detection of cancer and multidisciplinary approach in management of cancer

27	SU9.3	Communicate the results of surgical investigations and counsel the patient appropriately
28	SU10.1	Describe the principles of perioperative management of common surgical procedures
29	SU10.2	Describe the steps and obtain informed consent in a simulated environment
30	SU10.3	Observe common surgical procedures and assist in minor surgical procedures; Observe emergency lifesaving surgical procedures
31	SU10.4	Perform basic surgical Skills such as First aid including suturing and minor surgical procedures in simulated environment
32	SU11.1	Describe principles of Preoperative assessment.
33	SU11.2	Enumerate the principles of general, regional, and local Anaesthesia.
34	SU11.3	Demonstrate maintenance of an airway in a mannequin or Equivalent
35	SU11.4	Enumerate the indications and principles of day care General surgery
36	SU11.5	Describe principles of providing post-operative pain relief and management of chronic pain.
37	SU11.6	Describe Principles of safe General Surgery
38	SU12.1	Enumerate the causes and consequences of malnutrition in the surgical patient
39	SU12.2	Describe and discuss the methods of estimation and replacement of the fluid and electrolyte requirements in the surgical patient
40	SU12.3	Discuss the nutritional requirements of surgical patients, the methods of providing nutritional support and their complications
41	SU13.1	Describe the immunological basis of organ transplantation & Allograft Rejection. Types Of Allograft Rejection.

42	SU13.2	Discuss the Principles of immunosuppressive therapy. Adverse effects Of Immunosuppressive therapy.
43	SU13.3	Enumerate Indications of Renal, Liver, Cardiac, Pancreas, Lung & Small Bowel Transplant . Causes Of Graft Dysfunction. Discuss the legal and ethical issues concerning organ donation. Clinical Testing Of Brain Stem Death
44	SU13.4	Counsel patients and relatives on organ donation in a simulated environment
45	SU14.1	Describe Aseptic techniques, Principles of sterilization and disinfection.
46	SU14.2	Describe Surgical approaches, incisions and the use of appropriate instruments in Surgery in general.
47	SU14.3	Describe the materials and methods used for surgical wound closure and anastomosis (sutures, knots and needles)
48	SU14.4	Demonstrate the techniques of asepsis and suturing in a simulated environment
49	SU15.1	Describe classification of hospital waste and appropriate methods of disposal.
50	SU16.1	Minimally invasive General Surgery: Describe indications advantages and disadvantages of Minimally invasive General Surgery
51	SU17.1	Describe the Principles of FIRST AID
52	SU17.2	Demonstrate the steps in Basic Life Support. CABDE Transport of injured patient in a simulated environment
53	SU17.3	Describe the Principles in management of mass casualties Triage of patients Significance of time management and golden hour
54	SU17.4	Describe Pathophysiology, mechanism of head injuries
55	SU17.5	Describe clinical features for neurological assessment and GCS in head injuries

56	SU17.6	Chose appropriate investigations and discuss the principles of management of head injuries
57	SU17.7	Describe the clinical features of soft tissue injuries. Chose appropriate investigations and discuss the principles of management.
58	SU17.8	Describe the pathophysiology of chest injuries.
59	SU17.9	Describe the clinical features and principles of management of chest injuries.
60	SU17.10	Demonstrate Airway maintenance. Recognize and manage tension pneumothorax, hemothorax and flail chest in simulated environment.
61	SU18.1	Describe the pathogenesis, clinical features and management of various cutaneous and subcutaneous infections.
62	SU18.2	Classify skin tumors Differentiate different skin tumors and discuss their management.
63	SU18.3	Describe and demonstrate the clinical examination of surgical patient including swelling and order relevant investigation for diagnosis. Describe and discuss appropriate treatment plan.
64	SU19.1	Describe the etiology and classification of cleft lip and palate
65	SU19.2	Describe the Principles of reconstruction of cleft lip and palate
66	SU20.1	Describe etiopathogenesis of oral cancer symptoms and signs of oropharyngeal cancer.
67	SU20.2	Enumerate the appropriate investigations and discuss the Principles of treatment.
68	SU21.1	Describe surgical anatomy of the salivary glands, pathology, and clinical presentation of disorders of salivary glands
69	SU21.2	Enumerate the appropriate investigations and describe the principles of treatment of disorders of salivary glands
70	SU22.1	Describe the applied anatomy and physiology of thyroid

71	SU22.2	Describe the etiopathogenesis of thyroidal swellings
72	SU22.3	Demonstrate and document the correct clinical examination of thyroid swellings and discuss the differential diagnosis and their management
73	SU22.4	Describe the clinical features, classification and principles of management of thyroid cancer
74	SU22.5	Describe the applied anatomy of parathyroid
75	SU22.6	Describe and discuss the clinical features of hypo - and hyperparathyroidism and the principles of their management
76	SU23.1	Describe the applied anatomy of adrenal glands
77	SU23.2	Describe the etiology, clinical features and principles of management of disorders of adrenal gland
78	SU23.3	Describe the clinical features, principles of investigation and management of Adrenal tumors
79	SU24.1	Describe the clinical features, principles of investigation, prognosis and management of pancreatitis.
80	SU24.2	Describe the clinical features, principles of investigation, prognosis and management of pancreatic endocrine tumours
81	SU24.3	Describe the principles of investigation and management of Pancreatic disorders including pancreatitis and endocrine tumors.
82	SU25.1	Describe applied anatomy and appropriate investigations for breast disease
83	SU25.2	Describe the etiopathogenesis, clinical features and principles of management of benign breast disease including infections of the breast
84	SU25.3	Describe the etiopathogenesis, clinical features, Investigations and principles of treatment of benign and malignant tumours of breast.
85	SU25.4	Counsel the patient and obtain informed consent for treatment of malignant conditions of the breast

86	SU25.5	Demonstrate the correct technique to palpate the breast for breast swelling in a mannequin or equivalent
87	SU26.1	Highlight the role of surgery in the management of coronary heart disease, valvular heart diseases and congenital heart diseases
88	SU26.3	Elucidate the clinical features of mediastinal diseases and the principles of management.
89	SU26.4	Explicate the etiology, pathogenesis, clinical features of tumors of lung and the principles of management
90	SU27.1	Describe the etiopathogenesis, clinical features, investigations and principles of treatment of occlusive arterial disease.
91	SU27.2	Demonstrate the correct examination of the vascular system and enumerate and describe the investigation of vascular disease
92	SU27.3	Expound the clinical features, investigations and principles of management of vasospastic disorders
93	SU27.4	Classify gangrene and describe the types of gangrene and principles of amputation
94	SU27.5	Describe the applied anatomy of venous system of lower limb
95	SU27.6	Describe pathophysiology, clinical features, Investigations and principles of management of DVT and Varicose veins
96	SU27.7	Describe pathophysiology, clinical features, investigations and principles of management of Lymph edema, lymphangitis and Lymphomas
97	SU27.8	Demonstrate the correct examination of the lymphatic system
98	SU28.1	Describe the risk factors, aetiology,classification, diagnosis and principles of management of Herniae.
99	SU28.2	Demonstrate the technique of examining a patient with hernia and to differentiate between various types of herniae.
100	SU28.3	Describe types aetiology & clinical features of peritonitis. Discuss the principles of resuscitation & management of various types of peritonitis.

101	SU28.4	Describe the diagnosis and principles of management of Intra-abdominal abscess. Describe the pathophysiology, clinical features, investigations and management of mesenteric cyst. Discuss the pathology of retroperitoneal tumours, classify and plan the management of retroperitoneal tumours.
102	SU28.5	Describe the gross anatomy, blood supply, lymphatic drainage and embryological development of esophagus. Classify congenital anomalies of esophagus and its management. Describe physiology of deglutition and basis of various motility disorders.
103	SU28.6	Classify the various benign and malignant disorders of the esophagus and discuss its management.
104	SU28.7	Describe the anatomy, blood supply, lymphatic drainage and physiology of gastric acid secretion and gastric motility.
105	SU28.8	Describe and discuss the aetiology, the clinical features, investigations and principles of management of peptic ulcer disease & benign gastric disorders. Discuss the pathophysiology of carcinoma stomach and plan management protocol.
106	SU28.9	Demonstrate the correct technique of examination of a patient with disorders of the stomach and gastric outlet obstruction.
107	SU28.10	Discuss the applied anatomy of liver. Describe the clinical features, Investigations and principles of management of various benign and malignant diseases of the liver.
108	SU28.11	Describe the applied anatomy of spleen. Discuss the diagnosis and principles of management of splenic trauma. Describe the post-splenectomy sepsis – prophylaxis and OPSI.
109	SU28.12	Describe the applied anatomy and anomalies of biliary system and gall bladder. Describe the diagnosis and principles of management of diseases of biliary system
110	SU28.13	Describe the applied anatomy and physiology of small and large bowel. Discuss the basis of radical resections in colorectal malignancy.
111	SU28.14	classify the various benign disorders of small and large bowel. Discuss the various symptoms and signs of benign bowel disorders.
112	SU28.15	Describe the clinical features, investigations and principles of management of acute appendicitis. Describe the pathophysiology of appendicular malignancy and discuss the management.
113	SU28.16	Describe embryological development and applied anatomy of rectum and anal canal. Describe in brief about congenital anorectal anomalies and its management.
114	SU28.17	Explain the principles of management of benign and malignant anorectal diseases.

115	SU28.18	Plan and demonstrate clinical examination of abdomen and how to investigate and plan necessary treatment in acute and chronic abdominal disorders
116	SU29.1	Describe the causes, investigations and principles of management of Hematuria
117	SU29.2	Describe the clinical features, investigations and principles of management of congenital anomalies of genitourinary system
118	SU29.3	Describe the Clinical features, Investigations and principles of management of urinary tract infections
119	SU29.4	Describe the clinical features, investigations and principles of management of hydronephrosis
120	SU29.5	Describe the clinical features, investigations and principles of management of renal calculi
121	SU29.6	Describe the clinical features, investigations and principles of management of renal tumours
122	SU29.7	Describe the principles of management of acute and chronic retention of urine
123	SU29.8	Describe the clinical features, investigations and principles of management of bladder cancer
124	SU29.9	Describe the clinical features, investigations and principles of management of disorders of prostate
125	SU29.10	Demonstrate a digital rectal examination of the prostate in a mannequin or equivalent
126	SU29.11	Describe clinical features, investigations and management of urethral strictures
127	SU30.1	Describe the clinical features, investigations and principles of management of Phimosis, Paraphimosis and carcinoma penis. Indications and complications of circumcision. Aetiology, clinical features and management of carcinoma penis
128	SU30.2	Describe the applied anatomy and normal descent of testis Clinical features, investigations and principles of management of undescended testis.
129	SU30.3	Describe the anatomy clinical features, investigations and principles of management of epididymo-orchitis and torsion testis

130	SU30.4	Describe the applied anatomy clinical features, investigations and principles of management of varicocele
131	SU30.5	Describe the applied anatomy, clinical features, investigations and principles of management of Hydrocele
132	SU30.6	Describe classification, clinical features, investigations and principles of management of tumours of testis

INTEGRATION

		HUMAN ANATOMY		
SL.NO	NUMBER	COMPETENCY	Vertical Integration	Horizontal Integration
1	AN6.3	Explain the concept of lymphoedema and spread of tumors via lymphatics and venous system	General Surgery	
2	AN9.2	Breast-Describe the location, extent, deep relations, structure, age changes, blood supply, lymphatic drainage, microanatomy and applied anatomy of breast	General Surgery	
3	AN10.4	Describe the anatomical groups of axillary lymph nodes and specify their areas of drainage	General Surgery	
4	AN10.6	Explain the anatomical basis of clinical features of Erb's palsy and Klumpke's paralysis	General Surgery	
5	AN10.7	Explain anatomical basis of enlarged axillary lymph nodes	General Surgery	
6	AN11.3	Describe the anatomical basis of Venepuncture of cubital veins	General Surgery	
7	AN12.8	Describe anatomical basis of Claw hand	General Surgery	
8	AN12.10	Explain infection of fascial spaces of palm	General Surgery	
9	AN12.11	Identify, describe and demonstrate important muscle groups of dorsal forearm with attachments, nerve supply and actions	General Surgery	
10	AN12.12	Identify & describe origin, course, relations, branches (or tributaries), termination of important nerves and vessels of back of forearm	General Surgery	
11	AN12.13	Describe the anatomical basis of Wrist drop	General Surgery	

12	AN12.14	Identify & describe compartments deep to extensor retinaculum	General Surgery	
13	AN15.3	Describe and demonstrate boundaries, floor, roof and contents of femoral triangle	General Surgery	
14	AN15.4	Explain anatomical basis of Psoas abscess & Femoral hernia	General Surgery	
15	AN16.2	Describe anatomical basis of sciatic nerve injury during gluteal intramuscular injections	General Surgery	
16	AN16.3	Explain the anatomical basis of Trendelenburg sign	General Surgery	
17	AN18.3	Explain the anatomical basis of foot drop	General Surgery	
18	AN19.3	Explain the concept of “Peripheral heart”	General Surgery	
19	AN20.4	Explain anatomical basis of enlarged inguinal lymph nodes	General Surgery	
20	AN20.5	Explain anatomical basis of varicose veins and deep vein thrombosis	General Surgery	
21	AN20.9	Identify & demonstrate palpation of vessels (femoral, popliteal, dorsalis pedis, post tibial), Mid inguinal point, Surface projection of: femoral nerve, Saphenous opening, Sciatic, tibial, common peroneal & deep peroneal nerve, great and small saphenous veins	General Medicine General Surgery	
22	AN23.1	Describe & demonstrate the external appearance, relations, blood supply, nerve supply, lymphatic drainage and applied anatomy of oesophagus	General Surgery	
23	AN23.2	Describe & demonstrate the extent, relations, tributaries of thoracic duct and enumerate its applied anatomy	General Surgery	
24	AN23.7	Mention the extent, relations and applied anatomy of lymphatic duct	General Surgery	
25	AN27.1	Describe the layers of scalp, its blood supply, its nerve supply and surgical importance	General Surgery	
26	AN28.8	Explain surgical importance of deep facial vein	General Surgery	
27	AN28.9	Describe & demonstrate the parts, borders, surfaces, contents, relations and nerve supply of parotid gland with course of its duct and surgical importance	General Surgery	
28	AN28.10	Explain the anatomical basis of Frey's syndrome	General Surgery	
29	AN29.2	Explain anatomical basis of Erb's & Klumpke's palsy	General Surgery	
30	AN29.3	Explain anatomical basis of wry neck	General Surgery	
31	AN30.1	Describe the cranial fossae & identify related structures.	General Surgery	
32	AN30.2	Describe & identify major foramina with structures passing through them	General Surgery	
33	AN33.2	Describe & demonstrate attachments, direction of fibres, nerve supply and actions of muscles of mastication	General Surgery	
34	AN33.4	Explain the clinical significance of pterygoid venous plexus	General Surgery	
35	AN33.5	Describe the features of dislocation of temporomandibular joint	General Surgery	
36	AN34.1	Describe & demonstrate the morphology, relations and nerve supply of submandibular salivary gland & submandibular ganglion	General Surgery	
37	AN34.2	Describe the basis of formation of submandibular stones	General Surgery	

38	AN35.2	Describe & demonstrate location, parts, borders, surfaces, relations & blood supply of thyroid gland	General Surgery	
39	AN35.5	Describe & demonstrate extent, drainage & applied anatomy of cervical lymph nodes	General Surgery	
40	AN35.8	Describe the anatomically relevant clinical features of Thyroid swellings	General Surgery	
41	AN35.9	Describe the clinical features of compression of subclavian artery and lower trunk of brachial plexus by cervical rib	General Surgery	
42	AN43.5	Demonstrate- 1) Testing of muscles of facial expression, extraocular muscles, muscles of mastication, 2) Palpation of carotid arteries, facial artery, superficial temporal artery, 3) Location of internal and external jugular veins, 4) Location of hyoid bone, thyroid cartilage and cricoid cartilage with their vertebral levels	General Surgery	
43	AN43.6	Demonstrate surface projection of Thyroid gland, Parotid gland and duct, Pterion, Common carotid artery, Internal jugular vein, Subclavian vein, External jugular vein, Facial artery in the face & Accessory nerve	General Surgery	
44	AN44.1	Describe & demonstrate the Planes (transpyloric, transtubercular, subcostal, lateral vertical, linea alba, linea semilunaris), regions & Quadrants of abdomen	General Surgery	
45	AN44.7	Enumerate common Abdominal incisions	General Surgery	
46	AN46.1	Describe & demonstrate coverings, internal structure, side determination, blood supply, nerve supply, lymphatic drainage & descent of testis with its applied anatomy	General Surgery	
47	AN46.4	Explain the anatomical basis of varicocele	General Surgery	
48	AN46.5	Explain the anatomical basis of Phimosis & Circumcision	General Surgery	
49	AN47.1	Describe & identify boundaries and recesses of Lesser & Greater sac	General Surgery	
50	AN47.2	Name & identify various peritoneal folds & pouches with its explanation.	General Surgery	
51	AN47.3	Explain anatomical basis of Ascites & Peritonitis	General Surgery	
52	AN47.4	Explain anatomical basis of Subphrenic abscess	General Surgery	
53	AN47.5	Describe & demonstrate major viscera of abdomen under following headings (anatomical position, external and internal features, important peritoneal and other relations, blood supply, nerve supply, lymphatic drainage and applied aspects)	General Surgery	
54	AN47.6	Explain the anatomical basis of Splenic notch, accessory spleens, Kehr's sign, different types of vagotomy, liver biopsy (site of needle puncture), referred pain in cholecystitis, Obstructive jaundice, referred pain around umbilicus, radiating pain of kidney to groin & Lymphatic spread in carcinoma stomach	General Surgery	
55	AN47.7	Mention the clinical importance of Calot's triangle	General Surgery	
56	AN47.10	Enumerate the sites of portosystemic anastomosis	General Surgery	

57	AN47.11	Explain the anatomic basis of hematemesis & caput medusae in portal hypertension	General Surgery	
58	AN47.14	Describe the abnormal openings of thoracoabdominal diaphragm and diaphragmatic hernia	General Surgery	
59	AN48.5	Explain the anatomical basis of suprapubic cystostomy, Urinary obstruction in benign prostatic hypertrophy, Retroverted uterus, Prolapse uterus, Internal and external haemorrhoids, Anal fistula, Vasectomy, Tubal pregnancy & Tubal ligation	General Surgery	
60	AN48.6	Describe neurological basis of automatic bladder	General Surgery	
61	AN48.7	Mention the lobes involved in benign prostatic hypertrophy & prostatic cancer	General Surgery	
62	AN48.8	Mention the structures palpable during vaginal & rectal examination	Obstetrics & Gynaecology General Surgery	
63	AN49.4	Describe & demonstrate boundaries, content & applied anatomy of Ischiorectal fossa	General Surgery	
64	AN52.5	Describe the development and congenital anomalies of diaphragm	General Surgery	
65	AN52.6	Describe the development and congenital anomalies of foregut, midgut & hindgut	General Surgery	
66	AN52.7	Describe the development of urinary system	General Surgery	
67	AN53.1	Identify & hold the bone in the anatomical position, describe the salient features, articulations & demonstrate the attachments of muscle groups	General Surgery, Obstetrics & Gynaecology	
68	AN55.1	Demonstrate the surface marking of regions and planes of abdomen, superficial inguinal ring, deep inguinal ring , McBurney's point, Renal Angle & Murphy's point	General Surgery	
69	AN55.2	Demonstrate the surface projections of: stomach, liver, fundus of gall bladder, spleen, duodenum, pancreas, ileocaecal junction, idneys & root of mesentery	General Surgery	

		BIOCHEMISTRY		
SL.NO	NUMBER	COMPETENCY	Vertical Integration	Horizontal Integration
1	BI10.1	Describe the cancer initiation promotion oncogenes & oncogene activation.	Obstetrics & Gynaecology, General Surgery, Pathology	
2	BI10.2	Describe various biochemical tumor markers and the biochemical basis of cancer therapy.	Obstetrics & Gynaecology, General Surgery, Pathology	

3	BI10.3	Describe the cellular and humoral components of the immune system & describe the types and structure of antibody	Obstetrics & Gynaecology, General Surgery, Pathology	

		BIOCHEMISTRY		
SL.NO		COMPETENCY	Vertical Integration	Horizontal Integration
1	PA4.1	Define and describe the general features of acute and chronic inflammation including stimuli, vascular and cellular events	General Surgery	
2	PA4.2	Enumerate and describe the mediators of acute inflammation	General Surgery	
3	PA5.1	Define and describe the process of repair and regeneration including wound healing and its types	General Surgery	
4	PA6.3	Define and describe shock, its pathogenesis and its stages	General Surgery	
5	PA8.1	Describe the diagnostic role of cytology and its application in clinical care	General Surgery	
6	PA8.2	Describe the basis of exfoliative cytology including the technique, stains used	General Surgery	
7	PA19.1	Enumerate the causes and describe the differentiating features of lymphadenopathy	General Surgery	
8	PA19.2	Describe the pathogenesis and pathology of tuberculous lymphadenitis	General Surgery	
9	PA19.4	Describe and discuss the pathogenesis pathology and the differentiating features of Hodgkin's and non-Hodgkin's lymphoma	General Surgery	
10	PA19.5	Identify and describe the features of Hodgkin's lymphoma in a gross and microscopic specimen	General Surgery	
11	PA19.6	Enumerate and differentiate the causes of splenomegaly	General Surgery, General Medicine	
12	PA22.4	Enumerate blood components and describe their clinical uses	General Surgery, General Medicine	
13	PA24.4	Describe and etiology and pathogenesis and pathologic features of carcinoma of the stomach	General Surgery	
14	PA24.5	Describe and etiology and pathogenesis and pathologic features of Tuberculosis of the intestine	General Surgery	
15	PA24.6	Describe and etiology and pathogenesis and pathologic and distinguishing features of inflammatory bowel disease	General Surgery	

16	PA24.7	Describe the etiology and pathogenesis and pathologic and distinguishing features of carcinoma of the colon	General Surgery	
17	PA25.2	Describe the pathophysiology and pathologic changes seen in hepatic failure and their clinical manifestations, complications and consequences	General Medicine, General Surgery	
18	PA25.4	Describe the pathophysiology, pathology and progression of alcoholic liver disease including cirrhosis	General Medicine, General Surgery	
19	PA25.5	Describe the etiology, pathogenesis and complications of portal hypertension	General Medicine, General Surgery	
20	PA28.10	Describe the etiology, pathogenesis, pathology, laboratory findings, distinguishing features progression and complications of acute and chronic pyelonephritis and reflux nephropathy	Human Anatomy, General Surgery	
21	PA28.13	Define, classify and describe the etiology, pathogenesis, pathology, laboratory urinary findings, distinguishing features, progression and complications of renal stone disease and obstructive uropathy	General Surgery	
22	PA28.16	Describe the etiology, genetics, pathogenesis, pathology, presenting features and progression of urothelial tumors	General Surgery	
23	PA29.1	Classify testicular tumors and describe the pathogenesis, pathology, presenting and distinguishing features, diagnostic tests, progression and spread of testicular tumors	General Surgery	
24	PA29.2	Describe the pathogenesis, pathology, presenting and distinguishing features, diagnostic tests, progression and spread of carcinoma of the penis	General Surgery	
25	PA29.3	Describe the pathogenesis, pathology, hormonal dependency, presenting and distinguishing features, urologic findings and diagnostic tests of benign prostatic hyperplasia	General Surgery	
26	PA29.4	Describe the pathogenesis, pathology, hormonal dependency, presenting and distinguishing features, diagnostic tests, progression and spread of carcinoma of the prostate	General Surgery	
27	PA29.5	Describe the etiology, pathogenesis, pathology and progression of prostatitis	General Surgery	
28	PA31.1	Classify and describe the types, etiology, pathogenesis, pathology and hormonal dependency of benign breast disease	Human Anatomy, General Surgery	
29	PA31.2	Classify and describe the epidemiology, pathogenesis, classification, morphology, prognostic factors, hormonal dependency, staging and spread of carcinoma of the breast	General Surgery	
30	PA31.3	Describe and identify the morphologic and microscopic features of carcinoma of the breast	General Surgery	
31	PA32.1	Enumerate, classify and describe the etiology, pathogenesis, pathology and iodine dependency of thyroid swellings	Human Anatomy , Physiology, General Medicine, Pathology	

32	PA32.6	Describe the etiology, pathogenesis, manifestations, laboratory, morphologic features, complications and metastases of pancreatic cancer	General Surgery	
33	PA32.9	Describe the etiology, pathogenesis, manifestations, laboratory and morphologic features of adrenal neoplasms	Human Anatomy, Physiology, General Medicine, General Surgery	

SL.NO	NUMBER	COMPETENCY	Vertical Integration	Horizontal Integration
1	MI1.4	Classify and describe the different methods of sterilization and disinfection. Discuss the application of the different methods in the laboratory, in clinical and surgical practice	General Surgery	
2	MI1.5	Choose the most appropriate method of sterilization and disinfection to be used in specific situations in the laboratory, in clinical and surgical practice	General Surgery	
3	MI7.1	Describe the etio-pathogenesis and discuss the laboratory diagnosis of infections of genitourinary system	General Surgery	
4	MI8.7	Demonstrate Infection control practices and use of Personal Protective Equipments (PPE)	General Surgery	Community Medicine

FM1.9	Describe the importance of documentation in medical practice in regard to medicolegal examinations, Medical Certificates and medicolegal reports especially --maintenance of patient case records, discharge summary, prescribed registers to be maintained in Health Centres. -- maintenance of medico-legal register like accident register. -- documents of issuance of wound certificate -- documents of issuance of drunkenness certificate. -- documents of issuance of sickness and fitness certificate. -- documents for issuance of death certificate. -- documents of Medical Certification of Cause of Death - Form Number 4 and 4A -- documents for estimation of age by physical, dental and radiological examination and issuance of certificate	K	KH	Y	Lecture, Small group discussion

Number	COMPETENCY The student should be able to	Vertical Integration	Horizontal Integration
FM2.19	Investigation of anaesthetic, operative deaths:Describe and discuss special protocols for conduction of autopsy and for collection, preservation and dispatch of related material evidences	Anesthesiology, General Surgery	
FM2.25	Describe types of injuries, clinical features, patho-physiology, post-mortem findings and medico-legal aspects in cases of burns, scalds, lightening, electrocution and radiations.	General Surgery	
FM3.3	Mechanical injuries and wounds: Define, describe and classify different types of mechanical injuries, abrasion, bruise, laceration, stab wound, incised wound, chop wound, defense wound, self-inflicted/fabricated wounds and their medico-legal aspects.	General Surgery	
FM3.4	Mechanical injuries and wounds: define injury, assault & hurt. Describe IPC pertaining to injuries	General Surgery	
FM3.6	Mechanical injuries and wounds:Describe healing of injury and fracture of bones with its medico-legal importance	General Surgery	
FM3.8	Mechanical injuries and wounds:Describe and discuss different types of weapons including dangerous weapons and their examination.	General Surgery, Orthopaedics	
FM3.9	Firearm injuries:Describe different types of firearms including structure and components, along with description of ammunition propellant charge and mechanism of fire-arms, different types of cartridges and bullets and various terminology in relation of firearm – caliber, range, choking.	General Surgery, Orthopaedics	

Number	COMPETENCY	Vertical Integration	Horizontal Integration
FM3.10	Firearm injuries: Describe and discuss wound ballistics-different types of firearm injuries, blast injuries and their interpretation, preservation and dispatch of trace evidences in cases of firearm and blast injuries,various tests related to confirmation of use of firearms	General Surgery, Orthopaedics	
FM3.11	Regional Injuries: Describe and discuss regional injuries to head (Scalp wounds, fracture skull, intracranial haemorrhages, coup and contrecoup injuries), neck, chest, abdomen, limbs, genital organs, spinal cordand skeleton	General Surgery, Orthopaedics	
FM3.12	Regional Injuries: Describe and discuss injuries related to fall from height and vehicular injuries – Primary and Secondary impact, Secondaryinjuries, crush syndrome, railway spine.	General Surgery, Orthopaedics	

DR15.3	Enumerate the indications and describe the pharmacology, indications and adverse reactions of topical and systemic drugs used in treatment of pyoderma	General Surgery	Microbiology, Pharmacology
DR15.4	Enumerate the indications for surgical referral	General Surgery	
AS3.1	Describe the principles of preoperative evaluation		General Surgery, General Medicine
AS3.2	Elicit, present and document an appropriate history including medication history in a patient undergoing Surgery as it pertains to a preoperative anaesthetic evaluation		General Surgery, General Medicine

AS3.3	Demonstrate and document an appropriate clinical examination in apatient undergoing General Surgery		General Surgery, General Medicine
AS3.4	Choose and interpret appropriate testing for patients undergoingSurgery		General Surgery, General Medicine
AS3.5	Determine the readiness for General Surgery in a patient based onthe preoperative evaluation		General Surgery, General Medicine
AS5.6	Observe and describe the principles and steps/ techniques involved in common blocks used in Surgery(including brachial plexus blocks)		General Surgery

AS6.3	Describe the common complications encountered by patients in therecovery room, their recognition and principles of management		General Surgery
AS9.3	Describe the principles of fluid therapy in the preoperative period		General Surgery
AS9.4	Enumerate blood products and describe the use of blood productsin the preoperative period	Pathology	General Surgery
AS10.3	Describe the role of communication in patient safety	AETCOM	General Surgery
IM5.8	Describe and discuss the pathophysiology, clinical evolution andcomplications of cholelithiasis and cholecystitis	General Surgery	
IM5.13	Enumerate the indications for ultrasound and other imaging studiesincluding MRCP and ERCP and describe the findings in liver disease	Radiodiagnosis	General Surgery
IM5.16	Describe and discuss the management of hepatitis, cirrhosis, portalhypertension, ascites, spontaneous, bacterial peritonitis and hepaticencephalopathy	Pharmacology	General Surgery
IM5.18	Enumerate the indications for hepatic transplantation		General Surgery
IM12.6	Perform and demonstrate a systematic examination based on thehistory that will help establish the diagnosis and severity includingsystemic signs of thyrotoxicosis and hypothyroidism, palpation of the pulse for rate and rhythm abnormalities, neck palpation of thethyroid and lymph nodes and cardiovascular findings		General Surgery
IM12.7	Demonstrate the correct technique to palpate the thyroid		General Surgery
IM12.8	Generate a differential diagnosis based on the clinical presentationand prioritise it based on the most likely diagnosis		General Surgery
IM12.9	Order and interpret diagnostic testing based on the clinical diagnosis including CBC, thyroid function tests and ECG and radioiodine uptake and scan		General Surgery
IM12.10	Identify atrial fibrillation, pericardial effusion and bradycardia onECG		General Surgery
IM12.11	Interpret thyroid function tests in hypo-and hyperthyroidism		General Surgery
IM12.13	Describe the pharmacology, indications, adverse reaction,interactions of thyroxine and antithyroid drugs	Pharmacology	General Surgery
IM12.15	Describe and discuss the indications of thionamide therapy, radioiodine therapy and Surgeryin the management of thyrotoxicosis	Pharmacology	General Surgery

Number	COMPETENCY The student should be able to	Vertical Integration	Horizontal Integration
IM13.7	Elicit document and present a history that will help establish the aetiology of cancer and includes the appropriate risk factors, duration and evolution		General Surgery
IM13.8	Perform and demonstrate a physical examination that includes an appropriate general and local examination that excludes the diagnosis, extent spread and complications of cancer		General Surgery
IM13.9	Demonstrate in a mannequin the correct technique for performing breast exam, rectal examination and cervical examination and papsmear	Human Anatomy	General Surgery
IM13.10	Generate a differential diagnosis based on the presenting symptoms and clinical features and prioritise based on the most likely diagnosis		General Surgery
IM13.13	Describe and assess pain and suffering objectively in a patient with cancer	Pharmacology	General Surgery
IM13.14	Describe the indications for General Surgery, radiation and chemotherapy for common malignancies	Pharmacology	General Surgery
IM14.14	Describe and enumerate the indications and side effects of bariatric surgery		General Surgery
IM15.1	Enumerate, describe and discuss the aetiology of upper and lower GI bleeding	Pathology	General Surgery
IM15.2	Enumerate, describe and discuss the evaluation and steps involved in stabilizing a patient who presents with acute volume loss and GI bleed	Pathology	General Surgery
IM15.3	Describe and discuss the physiologic effects of acute blood and volume loss	Pathology, Physiology	General Surgery
IM15.4	Elicit document and present an appropriate history that identifies the route of bleeding, quantity, grade, volume loss, duration, etiology, comorbid illnesses and risk factors		General Surgery

Number	COMPETENCY The student should be able to	Vertical Integration	Horizontal Integration
IM15.5	Perform, demonstrate and document a physical examination based on the history that includes general examination, volume assessment and appropriate abdominal examination		General Surgery
IM15.6	Distinguish between upper and lower gastrointestinal bleeding based on the clinical features		General Surgery
IM15.7	Demonstrate the correct technique to perform an anal and rectal examination in a mannequin or equivalent		General Surgery
IM15.8	Generate a differential diagnosis based on the presenting symptoms and clinical features and prioritise based on the most likely diagnosis		General Surgery
IM15.9	Choose and interpret diagnostic tests based on the clinical diagnosis including complete blood count, PT and PTT, stool examination, occult blood, liver function tests, H.pylori test.	Pathology	General Surgery
IM15.10	Enumerate the indications for endoscopy, colonoscopy and other imaging procedures in the investigation of Upper GI bleeding		General Surgery
IM15.11	Develop, document and present a treatment plan that includes fluid resuscitation, blood and blood component transfusion, and specific therapy for arresting blood loss	Pathology	General Surgery
IM15.12	Enumerate the indications for whole blood, component and platelet transfusion and describe the clinical features and management of a mismatched transfusion	Pathology	General Surgery
IM15.13	Observe cross matching and blood / blood component transfusion	Pathology	General Surgery
IM15.14	Describe and enumerate the indications, pharmacology and side effects of pharmacotherapy of pressors used in the treatment of Upper GI bleed	Pharmacology	General Surgery

Number	COMPETENCY The student should be able to	Vertical Integration	Horizontal Integration
IM15.15	Describe and enumerate the indications, pharmacology and side effects of pharmacotherapy of acid peptic disease including Helicobacter pylori	Pharmacology, Microbiology	General Surgery
IM15.16	Enumerate the indications for endoscopic interventions and Surgery		General Surgery
IM15.17	Determine appropriate level of specialist consultation		General Surgery
IM15.18	Counsel the family and patient in an empathetic non-judgmental manner on the diagnosis and therapeutic options		General Surgery
IM16.12	Enumerate and discuss the indications for further investigations including antibodies, colonoscopy, diagnostic imaging and biopsy in the diagnosis of chronic diarrhea	Pathology	General Surgery
IM16.15	Distinguish, based on the clinical presentation, Crohn's disease from ulcerative colitis	Pathology	General Surgery
IM16.17	Describe and enumerate the indications for Surgery in inflammatory bowel disease		General Surgery
IM18.15	Enumerate the indications for Surgery in a hemorrhagic stroke		General Surgery
IM19.9	Enumerate the indications for use of Surgery and botulinum toxin in the treatment of movement disorders	Pharmacology	General Surgery
IM22.2	Describe the aetiology, clinical manifestations, diagnosis and clinical approach to primary hyperparathyroidism	Pathology	General Surgery

Number	COMPETENCY The student should be able to	Vertical Integration	Horizontal Integration
IM24.11	Describe and discuss the aetiopathogenesis, clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of the elderly undergoing surgery		Anesthesiology, General Surgery
OG26.2	Describe the causes, prevention, clinical features, principles of management of genital injuries and fistulae		General Surgery
OG33.2	Describe the principles of management including Surgery and radiotherapy of benign, pre-malignant (CIN) and malignant Lesions of the Cervix		General Surgery
PE21.8	Elicit, document and present a history pertaining to diseases of the Genitourinary tract		General Surgery
PE21.14	Recognize common surgical conditions of the abdomen and genitourinary system and enumerate the indications for referral including acute and subacute intestinal obstruction, appendicitis, pancreatitis, perforation, intussusception, Phimosis, undescended testis, Chordee, hypospadias, Torsion testis, hernia, Hydrocele, Vulval Synechiae		General Surgery
OR1.1	Describe and discuss the principles of pre-hospital care and casualty management of a trauma victim including principles of triage		General Surgery - Anaesthesiology
OR1.2	Describe and discuss the aetiopathogenesis, clinical features, investigations, and principles of management of shock		General Surgery

Number	COMPETENCY The student should be able to	Vertical Integration	Horizontal Integration
OR1.3	Describe and discuss the aetiopathogenesis, clinical features, investigations, and principles of management of soft tissue injuries		General Surgery
OR1.4	Describe and discuss the principles of management of soft tissue injuries		General Surgery
OR3.1	Describe and discuss the aetiopathogenesis, clinical features, Investigations and principles of management of Bone and Joint infections a) Acute Osteomyelitis b) Subacute osteomyelitis c) Acute Suppurative arthritis d) Septic arthritis & HIV infection e) Spirochaetal infection f) Skeletal Tuberculosis	Pathology, Microbiology	General surgery
OR3.3	Participate as a member in team for procedures like drainage of abscess, sequestrectomy/ saucerisation and arthrotomy		General Surgery
OR4.1	Describe and discuss the clinical features, Investigation and principles of management of Tuberculosis affecting major joints (Hip, Knee) including cold abscess and caries spine	Pathology	General surgery
OR10.1	Describe and discuss the aetiopathogenesis, clinical features, Investigations and principles of management of benign and malignant bone tumours and pathological fractures	Pathology	General surgery, Radiotherapy
OR11.1	Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of peripheral nerve injuries in diseases like foot drop, wrist drop, claw hand, palsies of Radial, Ulnar, Median, Lateral Popliteal and Sciatic Nerves	Human Anatomy	General Medicine, General surgery
PM5.1	Enumerate the indications and describe the principles of amputation		Orthopedics, General Surgery

Number	COMPETENCY The student should be able to	Vertical Integration	Horizontal Integration
PM7.8	Enumerate the causes of, describe, classify Pressure sores, prevention, and treatment.		General Surgery
PM7.9	Enumerate the indications of debridement, and Split thickness skin grafting.		General Surgery
PM8.1	Describe the clinical features, evaluation, diagnosis and management of disability following traumatic brain injury		General Medicine, Orthopedics, General Surgery
RT1.1	Describe and discuss definition of radiation, mechanism of action of radiation, types of radiation		General Surgery Anaesthesiology
RT1.3	Enumerate, describe and discuss and classify staging of cancer (AJCC, FIGO etc.)	Pathology	General Surgery, General Medicine
RT4.5	Describe and discuss role of radiation in management of common malignancies in India (region specific)	Pathology	General Surgery, Obstetrics & Gynaecology
RT4.6	Describe and discuss radiotherapy for benign disease	Pathology	General Surgery, Obstetrics & Gynaecology
RT4.7	Counsel patients regarding acute and late effects of radiation and supportive care	Pathology	General Surgery, Obstetrics & Gynaecology
RT4.8	Describe oncological emergencies and palliative care		General Surgery, Obstetrics & Gynaecology
RT5.1	Describe and discuss cancer prevention, screening, vaccination, cancer registry	Pathology	General Surgery, Obstetrics & Gynaecology



Curriculum for Anaesthesiology 2022



**Ramaiah Medical College
Ramaiah University of Applied
Sciences
Bengaluru-560054**

ANAESTHESIOLOGY

INTRODUCTION

The purpose of anesthesia training for medical students is not to make anesthesiologists out of all medical students, but to give students knowledge of basic concepts used in anesthesia and to teach them skills of airway management and vascular access that may be useful to them in other areas of medical practice.

The physician should have a good knowledge of what the anesthetic will do to the patient, even though the physician does not administer it him or herself.

The student, therefore, should observe and study the physiological changes which take place in the anesthetized patient. When these changes are of sufficient magnitude, they become complications or toxic effects.

The student should learn what these are, how they are caused, and how they may present and be treated. Emphasis should be laid on good preoperative preparation.

Students should learn basic techniques of maintaining a clear airway and giving assisted or artificial ventilation. They should also learn how to position the patient's head, how to hold the chin and how to insert an airway. Medical students should learn enough about an anaesthesia machine.

In addition to these technical accomplishments, the student may have the opportunity to administer either general or spinal anaesthesia under the direct and constant supervision of a member of the staff.

AIM:

Impart quality education through innovative teaching and research.

GOAL:

The goal of teaching the undergraduate student in Anaesthesiology is to impart knowledge of basic concepts used in anaesthesia and to teach them skills of airway management and vascular access that may be useful to them in other areas of medical practice.

Objectives:

The student at the end of the program should be able to

A. Period of Training –Phase III part 1 MBBS

Cognitive Domain:

1. Introduce principles of acute medicine as it is practiced in managing the anesthetized patient in the operating room and in managing the patient in the recovery unit.
2. Discuss and demonstrate principles of applied physiology and applied pharmacology. Simulation based teaching is ideal to teach many aspects of applied physiology and pharmacology.
3. Review principles of and teach skills in resuscitation (cardiopulmonary, cerebral, fluid and others).
4. Teach care of the unconscious patient, including airway and ventilation management.
5. Teach management of blood, fluid, electrolyte balance, and metabolic disturbances in the surgical patient, with specific emphasis on those derangements which are encountered in the anesthetized patient.
6. Review management of acute and chronic pain problems.
7. Introduce concepts of drug interactions, especially as they apply to patients receiving anesthesia.
8. Demonstrate the evaluation of patients relative to surgical and anesthetic risk. Teach appropriate preoperative preparation of patients subjected to surgery and anesthesia.
9. Introduce the various techniques of anesthesiology.

10. Pharmacology of muscle relaxant, application and monitoring
11. Pharmacology: Basic / Applied of local anaesthetics: Various types of blocks advantages / Problems with each. Description for few main blocks. Local infiltration , Brachial Plexus, Caudal etc.

Skill Domain:

Maintenance of Clear airway Bag Mask Ventilation

Starting a Venous Access

CPR — Basic and advanced

Giving a simple infiltration block,

Performing A lumbar puncture

Affective Domain:

Demonstrate cultural awareness and sensitivity with patients and colleagues;

- Understand basic communication techniques including informed consent;
- Discuss all aspects of end of life care, including Advanced Healthcare Directives, and demonstrate sensitivity towards patients, families and colleagues in these circumstances
- Develop rapport, trust and ethical therapeutic relationships;
- Participate effectively and appropriately in the multi-disciplinary healthcare team;
- Effectively work with other healthcare professionals to prevent and resolve inter-professional conflict;

B. Period of training-

Internship

Goal

- The aim of posting of an intern in anaesthesia is to impart such knowledge and skills that may enable him to understand principles of anaesthesia and recognize risk and complications of anaesthesia.

At the end of internship, he/she should be able to perform cardio-pulmonary resuscitation correctly, including recognition of cardiac arrest.

A. An intern must have observed or preferably assisted in:

- (i) Pre-anaesthetic check-up and prescribe pre-anaesthetic medications;
- (ii) Venepuncture and set up intravenous drip;
- (iii) Laryngoscopy and endotracheal intubation;
- (iv) Lumbar puncture, spinal anaesthesia and simple nerve blocks;
- (v) Simple general anaesthetic procedures under supervision;
- (vi) Monitor patients during anaesthesia and in the post-operative period;
- (vii) Maintain anaesthetic records;
- (viii) Perform cardio-pulmonary resuscitation correctly, including recognition of cardiac arrest.

B. Skill that an intern should be able to perform under supervision:

- (i) Counselling and advice regarding various methods of anaesthesia;
- (ii) Recognise problems associated with emergency anaesthesia;
- (iii) Recognise and assist in treating complications in the post-operative period.

C. An intern must have observed or preferably assisted at the following operations/procedures : Anaesthesia for major and minor surgical and other procedures.

Mandatory Exclusive Anesthesiology and Critical Care 2 weeks Includes postings in Operation Theatre, Intensive Care Units, Basic Life Support (BSL) training and additionally Pain Clinic and Palliative Care, if available

Teaching Learning Methods:

The university incorporates the guidelines of the CBME curriculum prescribed by the National Medical Commission (NMC). Teaching and learning in anesthesiology should be guided through a series of posting in which the emphasis is laid on practical hands –on experience. Simulator mannequins to be purchased for better skill development and to reduce the danger to the patients during the learning curve of student. To allow repeat practice according to ability of the student to reach the level of competence needed.

Posting Schedule

The students will be posted to

1 Preanesthetic Clinic: Preoperative evaluation & optimization.

2 Operating theatre: Anaesthetic Machine /monitoring, Anaesthetic Techniques

3 Recovery Room: Recovery criteria: Management of complications.

4 Intensive Care Unit: Management of respiratory failure, various types of ventilator assistance devices, Monitoring Devices and application. Management of patient in Coma.

5 Pain Clinic: Evaluation of patient / non invasive / invasive management.

Emergency on Call: The Intern will be posted to same areas as above and will be asked to follow a case from preoperative preparation to full recovery to get an idea of comprehensive Care. Anaesthesiology

A log book will need to be completed by the student under the supervision of the faculty member

Anaesthesiology	Lectures (hours)	Small group learning (Tutorials / Seminars) /Integrated learning (hours)	Self - Directed Learning (hours)	Total (hours)
Phase III part 1	08	10	02	20

AETCOM	Lectures (hours)	Small group learning (Tutorials / Seminars) /Integrated learning (hours)	Self - Directed Learning (hours)	Total (hours)
Phase III part 1	01	01	00	02

MINIMUM TEACHING HOURS IN INTERNSHIP

Subject	Period of posting
Anaesthesiology	15 days

Competencies in Phase III part 1 MBBS		
No.	Topic	Competencies
1	Anaesthesiology as a specialty	04
2	Cardiopulmonary resuscitation	02
3	Preoperative evaluation and medication	06
4	General Anaesthesia	07
5	Regional anaesthesia	06
6	Post-anaesthesia recovery	03
7	Intensive Care Management	05
8	Pain and its management	05

9	Fluids	04
10	Patient safety	04
TOTAL		46

Competencies in Internship			
Sl no	Procedures	Competencies	Procedures requiring certification
1	Preanaesthetic check up and medications	3	1
2	Venepuncture set up and IV drip	2	1
3	Simple general anaesthetic procedures/regional anaesthesia	3	1
4	Monitoring of patients during post operative period. Recognition and treatment of complications in the post operative period	3	1
5	Recognition and management of problems associated with emergency anesthesia	3	1
6	Maintenance of anesthetic record	3	1
7	Laryngoscopy, Endotracheal intubation Simple general anesthetic procedures / regional Anesthesia	4	1
8	Usage of Life support System	3	1

9	To perform CPBR on Mannequin	4	1
10	Interpretation of ABG	2	1
Total		31	10

Sl no	Procedures	O	No	A	No	PA	No	PI	No	Supervisor's signature
1	Preanaesthetic check up and medications					3				
2	Venepuncture set up and IV drip			3		3				
3	Simple general anaesthetic procedures/regional anaesthesia					3				
4	Monitoring of patients during post-operative period. Recognition and treatment of complications in the post-operative period							5		
5	Recognition and management of problems associated with emergency anaesthesia			3						
6	Laryngoscopy, Endotracheal intubation Simple			3		3				

	general anesthetic procedures / regional Anesthesia									
7	Usage of Life support System	3								
8	To perform CPBR on Mannequin						3			
9	Interpretation of ABG						5			
10	Maintenance of anesthetic record						5			

O: Observed, A: Assisted, PA: Performed under assistance, PI: performed independently

Summary of TL methods and list of competencies to be covered in Phase III MBBS and Assessment methods

Sl. No.	Teaching hours and type	Competency numbers	Assessment methods
1.	Lecture	AS1.1 to 1.4, AS 3.1 to 3.6, AS4.1 , 4.2, 4.3, 4.5 AS 8.1-8.5	Written,
2	Seminar	AS2.1,2.2 AS4.6, 4.7 AS 5.1, 5.2, 5.6 AS 6.1, 6.3 AS 7.1 to 7.5 AS9.3, 10.1 to 10.4	Written,
3	DOAP, bedside, small group discussion	AS 3.2 AS 4.3, 4.5 AS 5.2 , 5.3, 5.5, 5.6, AS 6.1 , 6.3, AS 7.1, 7.3, 7.4 AS 8.2 ,8.5, AS 9.1 ,9.2, 9.4, AS 10.2 PY11.14, SU 11.3, 11.5,	Skill assessment

		17.10 OR 1.1, 13.2	
4	SDL – 2 hr (Followed by reflective writing)	AS 5.4, AS 9.4	Written,

ASSESSMENT IN ANAESTHESIOLOGY

- 1. Summative Assessment** - Assessment in Anaesthesiology will be a part of general surgery assessment during university examination.
- 2. Formative Assessment** - An assessment conducted at the end of instruction to assess how much the student has learnt. An assessment conducted during the instruction with primary purpose of providing feedback for improving learning. Students will be assessed with MCQ's at the end of postings.
- 3. Assessment of Log-book**- Log book should record all activities like seminar, symposia, quizzes and other academic activities. It should be assessed regularly and submitted to the department.

Course outcome MBBS Phase III part I (Anaesthesiology)

At the end of the course the student should

- Describe the basic principles of a preoperative assessment including an airway examination and apply this knowledge in a clinical setting.
Assessment method : Written/ skill assessment
- Discuss the principles of intravenous therapy and perform intravenous access on a patient using a sterile technique.
Assessment method : Written/ skill assessment
- Describe a basic general anesthetic technique and commonly used pharmacologic agents including their mechanism of action.
Assessment method : Written
- Describe commonly used regional anaesthetic technique and local anaesthetic drugs
Assessment method : Written
- Describe the basic monitoring of a patient under anaesthesia

Assessment method : Written

- Discuss the basic principles of airway management in the unconscious patient.

Assessment method : Written/ skill assessment

- Perform BLS (basic life support) in a simulated environment.

Assessment method : skill assessment(ALC)

- Describe principles of pain management.

Assessment method : Written

-

RECOMMENDED LIST OF TEXTBOOKS:

TEXT BOOK RECOMMENDED

1. "The book of Anaesthesia" edited by Alan R. Aitkenhead, David J. Rowbotham, Graham Smith published by Churchill Livingstone.
2. "Fundamentals of Anaesthesia" edited by Colin Pinnock, Ted Lin, Tim Smith Published by Greenwich Medical Media Ltd.

Reference Books

1. Fundamental Principles and practice of Anaesthesia, Ed. Petter Hurttin, Cooper Butterworth, Published by Martin Dunitz, 2002.
2. Principles and Practice of Anaesthesiology Edited David E. Longnecker Published by Mosby St. Louis.
3. Lee's Synopsis of Anaesthesia, 14e by Jeremy N. Cashman BSc MD FRCA (Editor), Judith Dinsmore
4. Basics of Anesthesia 7th Edition - June 6, 2017 Manuel Pardo, Ronald Miller
5. Morgan & Mikhail's Clinical Anesthesiology, 6e John F. Butterworth IV, David C. Mackey, John D. Wasnick

FORMAT FOR ASSESSING PROFESSIONALISM

Sl. No.	Overall attendance (5)	Timely submission of log books /assignments (5)	Takes the trouble to complete the log book well (5)
1.			
2.			
3.			

Signature of Faculty mentor

Signature of HOD

Attendance

Grade	Percentage
5	95-100%
4	90-94%
3	85-89%
2	80-84%
1	< 80%

Submission of log books /assignments

Grade	Criteria
5	Always submits the logbook/assignments on time
4	Often submits the logbook/assignments on time
3	Frequently submits the logbook/assignments on time

2	Rarely submits the logbook on time
1	Has not submitted at all

Behaves respectfully with peers and teacher

Grade	Criteria
5	Demonstrates appropriate respectful behavior with peers and teachers always
4	Demonstrates appropriate respectful behavior with peers and teachers most of the time
3	Demonstrates appropriate respectful behavior with peers and teachers frequently
2	Demonstrates appropriate respectful behavior with peers and teachers rarely
1	Is arrogant and disrespectful to peers and teacher

SYLLABUS

List of Competencies and SLOs to be covered in Phase III MBBS Part I

Anaesthesiology as a specialty

Lecture – 1 hr

Assessment: Written/ Viva voce

AS1.1 Describe the evolution of Anaesthesiology as a modern specialty

AS1.2 Describe the roles of Anaesthesiologist in the medical profession (including as a peri-operative physician, in the intensive care and high dependency units, in the management of acute and chronic pain, including labour analgesia, in the resuscitation of acutely ill)

AS1.3 Enumerate and describe the principle of ethics as it relates to Anaesthesiology

AS1.4 Describe the prospects of Anaesthesiology as a career

Cardiopulmonary resuscitation

DOAP – 1 hr

Assessment: Skill assessment

AS2.1 Enumerate the indications, describe the steps and demonstrate in a simulated environment, Basic Life Support in adults, children and neonates

AS2.2 Enumerate the indications, describe the steps and demonstrate in a simulated environment, Advanced Life Support in adults and children

Preoperative evaluation and medication

Lecture – 1 hr , DOAP- 1 hr

Assessment: Written/ Viva voce/skill station

AS3.1 Describe the principles of preoperative evaluation

AS3.2 Elicit, present and document an appropriate history including medication history in a patient undergoing Surgery as it pertains to a preoperative anaesthetic evaluation

AS3.3 Demonstrate and document an appropriate clinical examination in a patient undergoing General Surgery

AS3.4 Choose and interpret appropriate testing for patients undergoing Surgery

AS3.5 Determine the readiness for General Surgery in a patient based on the preoperative evaluation

AS3.6 Choose and write a prescription for appropriate premedications for patients undergoing surgery

General Anaesthesia

Lecture – 1 hr , SGD- 1hr

Assessment: Written/ Viva voce

AS4.1 Describe and discuss the pharmacology of drugs used in induction and maintenance of general anaesthesia (including intravenous and inhalation induction agents, opiate and non opiate analgesics, depolarising and non depolarising muscle relaxants, anticholinesterases)

AS4.2 Describe the anatomy of the airway and its implications for general anaesthesia

AS4.3 Observe and describe the principles and the practical aspects of induction and maintenance of anaesthesia

AS4.4 Observe and describe the principles and the steps/ techniques in maintenance of vital organ functions in patients undergoing surgical procedures

AS4.5 Observe and describe the principles and the steps/ techniques in monitoring patients during anaesthesia

AS4.6 Observe and describe the principles and the steps/ techniques involved in day care anaesthesia

AS4.7 Observe and describe the principles and the steps/ techniques involved in anaesthesia outside the operating room

Regional anaesthesia

Lecture – 1 hr , DOAP- 1hr

Assessment: Written/ Viva voce

AS5.1 Enumerate the indications for and describe the principles of regional anaesthesia (including spinal, epidural and combined)

AS5.2 Describe the correlative anatomy of the brachial plexus, subarachnoid and epidural spaces

AS5.3 Observe and describe the principles and steps/ techniques involved in peripheral nerve blocks

AS5.4 Observe and describe the pharmacology and correct use of commonly used drugs and adjuvant agents in regional anaesthesia

AS5.5 Observe and describe the principles and steps/ techniques involved in caudal epidural in adults and children

AS5.6 Observe and describe the principles and steps/ techniques involved in common blocks used in surgery (including brachial plexus)

Post-anaesthesia recovery

Lecture – 1 hr , SDL-1 hr

Assessment: Written/ Viva voce

AS6.1 Describe the principles of monitoring and resuscitation in the recovery room

AS6.2 Observe and enumerate the contents of the crash cart and describe the equipment used in the recovery room

AS6.3 Describe the common complications encountered by patients in the recovery room, their recognition and principles of management

Intensive Care Management

Lecture – 1 hr , DOAP- 1hr

Assessment: Written/ Viva voce

AS7.1 Visit, enumerate and describe the functions of an Intensive Care Unit

AS7.2 Enumerate and describe the criteria for admission and discharge of a patient to an ICU

AS7.3 Observe and describe the management of an unconscious patient

AS7.4 Observe and describe the basic setup process of a ventilator

AS7.5 Observe and describe the principles of monitoring in an ICU

Pain and its management

Lecture – 1 hr , DOAP – 1hr

Assessment: Written/ Viva voce

AS8.1 Describe the anatomical correlates and physiologic principles of pain

AS8.2 Elicit and determine the level, quality and quantity of pain and its tolerance in patient or surrogate

AS8.3 Describe the pharmacology and use of drugs in the management of pain

AS8.4 Describe the principles of pain management in palliative

AS8.5 Describe the principles of pain management in the terminally ill

Fluids

Lecture – 1 hr , SDL- 1hr

Assessment: Written/ Viva voce

AS9.1 Establish intravenous access in a simulated environment

AS9.2 Establish central venous access in a simulated environment

AS9.3 Describe the principles of fluid therapy in the preoperative period

AS9.4 Enumerate blood products and describe the use of blood products in the preoperative period

Patient safety

Lecture – 1 hr , SGD- 1hr

Assessment: Written/ Viva voce

AS10.1 Enumerate the hazards of incorrect patient positioning

AS10.2 Enumerate the hazards encountered in the perioperative period and steps/techniques taken to prevent them

AS10.3 Describe the role of communication in patient

AS10.4 Define and describe common medical and medication errors in anaesthesia

Integration topics

Integration: The teaching should be aligned and integrated horizontally and vertically recognizing the importance of issues as they relate to the practice of anaesthesiology.

Sl. No.	Topic for integration	Subject [Competencies]
1	Describe the structure of neuro-muscular junction and transmission of impulses	Physiology PY3.4
2	Discuss the action of neuro-muscular blocking agents	Physiology PY3.5 Pharmacology
3	Demonstrate Basic Life Support in a simulated environment	Physiology PY11.14 General Medicine
4	Describe mechanism/s of action, types, doses, side effects, indications and contraindications of skeletal muscle relaxants	Pharmacology PH1.15 Physiology
5	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of local anaesthetics	Pharmacology PH1.17
6	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of general anaesthetics, and preanaesthetic medications	Pharmacology PH1.18
7	Investigation of anaesthetic, operative deaths: Describe and discuss special protocols for conduction of autopsy and for collection, preservation and dispatch of related material evidences	Forensic Medicine [FM2.19] General Medicine [
8	Alcohol disorders	Pharmacology [PH 1.20, 1.21] Pathology [PA 12.1, 25.4] General Medicine [IM 5.5] Forensic Medicine [FM 9.4]
9	Describe and enumerate the indications, use, side effects of narcotics in pain alleviation in patients with cancer	General Medicine IM13.17
10	Describe and discuss the aetiopathogenesis, clinical presentation, identification, functional changes,	General Medicine IM24.11 General Surgery

	acute care, stabilization, management and rehabilitation of the elderly undergoing surgery	
11	Describe principles of Preoperative assessment	General Surgery SU11.1
12	Enumerate the principles of general, regional, and local Anaesthesia.	General Surgery SU11.2
13	Demonstrate maintenance of an airway in a mannequin or equivalent	General Surgery SU11.3
14	Describe principles of providing post-operative pain relief and management of chronic pain.	General Surgery SU11.5
15	Demonstrate the steps in Basic Life Support. Transport of injured patient in a simulated environment	General Surgery SU17.2
16	Demonstrate Airway maintenance and recognize and management of tension pneumothorax, hemothorax and flail chest in simulated environment	General Surgery SU17.10
17	Describe and discuss the Principles of Pre hospital care and Casualty management of a trauma victim including principles of triage,	Orthopaedics OR1.1
18	Participate as a member in team for Resuscitation of Polytrauma victim by doing all of the following : (a) IV. access central - peripheral (b) Bladder catheterization (c) Endotracheal intubation (d) Splintage	Orthopaedics OR13.2 General Surgery

Curriculum for Otorhinolaryngology (ENT) 2022



**Ramaiah Medical College
Ramaiah University of Applied Sciences
Bengaluru-560054**

DEPARTMENT OF OTORHINOLARYNGOLOGY

Introduction to Department:

The department of Otorhinolaryngology (ENT) has state of the art facilities, offering an unparalleled opportunity to study ENT in a fully operational clinical environment. The department seeks to educate and inspire the next generation of doctors, by providing quality training through scientific excellence.

Teaching staff comprises of qualified ENT surgeons, training students to be adept with various clinical and basic surgical aspects of ENT, that they may face in their professional career. The department renders round the clock emergency ENT services in a well-equipped and well-maintained separate Out-Patient Department (OPD) and minor Operation Theater (OT) facilities with endoscopes, microscopes and monitors for the students to witness procedures and clinical findings, to have appropriate discussions. The department has modern amenities and a well-equipped library and museum with specimens and 3-D models, for better understanding and visualisation.

Students are trained in basic ENT examination and equipment handling like the appropriate use of the Bull's eye lamp, head mirror, otoscopy and basic ENT OPD instruments. They also have exposure to an adequate number of OPD and In-Patient Department (IPD) patients with an opportunity to present clinical cases to the staff and engage in productive discussions. They are also sensitised to patient communication, consent and medical ethics related to ENT. Innovative teaching methods include exposure to the Advanced Learning Center (ALC), which includes practicing simulated anterior nasal packing and otoscopy on mannequins.

The Department focus is on creating competent future doctors who can successfully assess and manage basic ENT illnesses.

The teaching faculty of ENT is qualified and competent. They are trained to impart quality education. The faculties have excelled in recent advances, research and innovative teaching methodology. The department also promotes student research program to inculcate the basic research methodology concepts.

This document provides the required guidelines to implement the Competency Based Medical Education (CBME) curriculum framed by National Medical Commission (NMC) for effective teaching-learning and evaluation of students.

Goal:

The goal of teaching the undergraduate student in Otorhinolaryngology is to impart such knowledge and skills that may enable him/her to manage common ENT conditions in day-to-day practice. He/she shall acquire competence for examination and basic management of ENT related conditions and identify the complicated ENT problems for referral to a higher center.

Objectives:

The student at the end of the program should be able to

Cognitive Domain:

1. Describe the Anatomy & physiology of ear, nose, throat, head & neck
2. Describe the pathophysiology of common diseases in ENT
3. Describe the national programs for prevention of deafness, cancer, noise & environmental pollution
4. Describe indications for and steps involved in the performance of diagnostic nasal Endoscopy
5. Describe the indications for and steps involved in the performance of Rigid/Flexible Laryngoscopy
6. Describe the indications for and steps involved in the performance of Otomicroscopic examination in a simulated environment
7. Describe the indications for and steps involved in the surgical procedures in ear, nose & throat
8. Describe the indications for and steps involved in the skills of emergency procedures in ear, nose & throat
9. Describe the clinical features, investigations and principles of management of Mucosal type of CSOM
10. Describe the clinical features, investigations and principles of management of diseases of the external ear
11. Describe the clinical features, investigations and principles of management of a patient with Hearing

loss

12. Describe the clinical features, investigations and principles of management of Squamosal type of CSOM
13. Describe the clinical features, investigations and principles of management of Otosclerosis
14. Describe the clinical features, investigations and principles of management of Sudden Sensorineural Hearing Loss
15. Describe the clinical features, investigations and principles of management of Noise Induced Hearing Loss
16. Describe the clinical features, investigations and principles of management of Facial Nerve palsy
17. Describe the clinical features, investigations and principles of management of Vertigo
18. Describe the clinical features, investigations and principles of management of Meniere's Disease
19. Describe the clinical features, investigations and principles of management of Tinnitus
20. Describe the clinical features, investigations and principles of management of DNS
21. Describe the clinical features, investigations and principles of management of Allergic Rhinitis
22. Describe the clinical features, investigations and principles of management of Vasomotor Rhinitis
23. Describe the clinical features, investigations and principles of management of Acute & Chronic Rhinitis
24. Describe the clinical features, investigations and principles of management of Epistaxis
25. Describe the clinical features, investigations and principles of management of Nasopharyngeal Angiofibroma
26. Describe the clinical features, investigations and principles of management of Chronic Sinusitis
27. Describe the clinical features, investigations and principles of management of Tumors of Maxilla

28. Describe the clinical features, investigations and principles of management of Tumors of Nasopharynx
29. Describe the clinical features, investigations and principles of management of diseases of the Salivary glands
30. Describe the clinical features, investigations and principles of management of Ludwig's angina
31. Describe the clinical features, investigations and principles of management of a patient with dysphagia
32. Describe the clinical features, investigations and principles of management of Acute & chronic abscesses in relation to Pharynx
33. Describe the clinical features, investigations and principles of management of Acute & Chronic Laryngitis
34. Describe the clinical features, investigations and principles of management of Benign lesions of the vocal cord
35. Describe the clinical features, investigations and principles of management of Vocal cord palsy
36. Describe the clinical features, investigations and principles of management of Malignancy of the Larynx & Hypopharynx
37. Describe the clinical features, investigations and principles of management of Stridor
38. Describe the Clinical features, Investigations and principles of management of diseases of Oesophagus
39. Describe the clinical features, investigations and principles of management of HIV manifestations of the ENT
40. Describe the clinical features, investigations and principles of management of trauma to the face & neck
41. Describe the clinical features, choose the correct investigations and discuss the principles of

management of Airway Emergencies

Psychomotor Domain:

1. Present an appropriate history in a patient presenting with an ENT complaint
2. Identify the common instruments used in ENT surgery and mention their uses
3. Demonstrate the correct use of a headlamp in the examination of the ear, nose and throat
4. Demonstrate the correct technique of examination of the ear including Otoscopy
5. Demonstrate the correct technique of performance and interpret tuning fork tests
6. Demonstrate the correct technique of examination of the nose & paranasal sinuses including the use of nasal speculum
7. Demonstrate the correct technique of examining the throat including the use of a tongue depressor
8. Demonstrate the correct technique of examination of neck including elicitation of laryngeal crepitus
9. Demonstrate the correct technique to perform and interpret pure tone audiogram & impedance audiogram
10. Observe the steps involved in the removal of foreign bodies from ear, nose & throat
11. Choose correctly and interpret radiological, microbiological & histological investigations relevant to the ENT disorders
12. Identify by clinical examination, malignant & pre- malignant ENT diseases
13. Identify, resuscitate and manage ENT emergencies in a simulated environment (including tracheostomy, anterior nasal packing, removal of foreign bodies in ear, nose, throat and upper respiratory tract)

14. Demonstrate the correct technique to hold visualize and assess the mobility of the tympanic membrane and its mobility and interpret and diagrammatically represent the findings
15. Demonstrate the correct technique to instilling topical medications into the ear, nose and throat in a simulated environment
16. Demonstrate the correct technique for syringing wax from the ear in a simulated environment
17. Present a clinical case and choose the correct investigations and discuss the principles of management of ASOM
18. Present a clinical case, choose the correct investigations and discuss the principles of management of OME
19. Present a clinical case, choose the correct investigations and discuss the principles of management of Discharging ear
20. Present a clinical case, choose the correct investigations and discuss the principles of management of CSOM
21. Present a correct history, demonstrate and describe the clinical features, choose the correct investigations and discuss the principles of management of Nasal Obstruction
22. Present a clinical case, choose the correct investigations and discuss the principles of management of Nasal Polyps
23. Present a clinical case, choose the correct investigations and discuss the principles of management of Adenoid hypertrophy
24. Present a clinical case, choose the correct investigations and discuss the principles of management of Acute & Chronic Tonsillitis
25. Observe the steps involved in myringotomy and myringoplasty
26. Observe the steps of a mastoidectomy

- 27.** Observe the steps involved in the performance of pure tone audiometry
- 28.** Interpret the results of an audiogram
- 29.** Observe the steps involved in the performance of Diagnostic Nasal Endoscopy (DNE)
- 30.** Observe and describe steps in Septoplasty
- 31.** Observe the steps involved in a tonsillectomy / adenoidectomy
- 32.** Present a clinical case, choose the correct investigations and discuss the principles of management of
hoarseness of voice
- 33.** Present a clinical case, choose the correct investigations and discuss the principles of management of
foreign bodies in the air & food passages
- 34.** Observe the steps involved in performing a tracheostomy
- 35.** Observe the care of the patient with a tracheostomy in the ward

Affective Domain:

1. Demonstrate humane behavior with mutual respect for each other - personal and professional.
2. Communicate effectively with teachers, technical staff, peers, patients during their learning activities.
3. Develop punctuality in attending academic sessions, submissions of records and assignments.
4. Demonstrate moral responsibility and accountability for their actions.
5. Demonstrate honesty and integrity in all learning activities.
6. Respect patients as a teacher during history taking and examination
7. Discuss the professional qualities of a physician of first contact and his/her responsibilities.
8. Take an informed consent from a patient and his/her family members regarding a procedure in a simulated environment

ENT COURSE OUTCOME FOR UNDERGRADUATE STUDENTS

ENCO 1. Elicit history and examination related to common otorhinolaryngology and head and neck diseases.

ENCO 2. To recognize, diagnose and ask for relevant investigations and manage common otorhinolaryngology problems in primary care settings.

ENCO 3. Identify common otorhinolaryngology emergencies, provide primary care and refer to higher center in a timely manner.

ENCO 4. Interpret radiological and audiological investigations for common otorhinolaryngology and head neck diseases.

ENCO 5. Perform minor otorhinolaryngology procedures under supervision with appropriate documentation.

ENCO 6. Identify hearing and speech impairment and refer for appropriate treatment and rehabilitation programs

ENCO 7. Educate and counsel regarding noise pollution, congenital disorders, neonatal hearing screening and rehabilitation and national program for deafness.

Teaching Learning Methods:

The university incorporates the guidelines of the CBME curriculum prescribed by the National Medical Commission (NMC). The department uses various innovative teaching learning methods to facilitate effective student learning.

Cognitive:

Sl. No.	T-L Method	Number of Hours
1	Interactive Lectures	27
2	Small Group Learning Tutorials Visit to hospital OPDs and Wards Problem based Learning for Integrated sessions Competitions/Seminars videos/role play/live/simulation	36
4	Self-Directed Learning	8

Psychomotor and Affective Domain

Sl. No.	T-L Method	Number of Hours
1.	• ALC visits - Anterior nasal packing and Otoscopy	2
	• Bedside Clinics and demonstration (Live)	36
	• OPD postings	40
	• OT postings	16
	• Demonstrations-videos/role play/live simulation	4

Assessment methods:

Formative Assessment:

The department follows the concept of continuous assessment for evaluating the students. The department of ENT will conduct **two internal assessments**.

This facilitates to give feedback to students on their learning. These tests allow regular and timely revision by the students. It also prepares the student to attend the summative examination with confidence.

Sl. No.	Assessment methods
1	Modified Long essay, Short Essay (SE)
2	Short answer questions (SAQ)
3	Multiple choice questions (MCQ)
4	Short Seminars
5	Structured Discussions
6	Table viva
7	Objective Structure Practical Examination (OSPE)

Guidelines for Internal assessment:

- 1) The department will conduct a minimum of two internal assessments at the end of each term
- 2) The **1st internal assessment** to include **one short essay** on **AETCOM module 3.3**
- 3) The marks obtained in the formative assessment should be displayed on the notice board within 1 -2 weeks after conducting the tests.

Theory:

- The theory paper will be conducted for **100 marks**
- Blue print guidelines to be followed for question paper setting.
- The distribution of marks will be as follows:
 - i. 40% of the subject questions will be based on clinical correlation and integration (LE, SE).
 - ii. 40% of the subject questions will be on comprehension level of questions (SE).
 - iii. 20% of the subject questions will be of recall type. (SAQs/ MCQs).
- Each **Internal assessment weightage** will be as follows:

Sl. No.	Topics	Weightage
1	Management of ENT conditions	65%
2	Anatomy and Physiology of the Ear, Nose, Throat	10%
3	Diagnostic and Therapeutic procedures in ENT	10%
4	Clinical Skills	15%

Scheme of Internal Assessment:

Sl. No.	Type of Question	Marks	Marks
1.	Long Essay	(1X10)=10	(2X10)=20
2.	Short Essay	(5X5) = 25	(10X5) = 50
3.	SAQs	(5X3) =15	(10X3) 30
4.	Total	50	100

Practical:

- The practical will be conducted for **25 marks**
- **Scheme for practical assessment:**

Sl. No.	Assessment type	Marks
1	Case Discussion (1x 20)	20
2	Viva (1x5)	05
Total		25

- The **log book** should be evaluated on a continuous basis and certified by the department before the summative examination

The **pass criteria** in each internal assessment will be 40% separately in theory and practical examination (50% combined) for **eligibility** for appearing in the University Examinations.

LOG BOOK:

The ENT log book should be completed and evaluated by the faculty on a timely basis. The same to be certified by the head of the department at the end of the program before summative examination.

Eligibility for Summative Examination:**Weightage of various assessments as eligibility criteria for Summative exam:**

Sl. No.	Type of Assessment	Weightage
1.	Internal assessment	75%
2.	End posting assessment (at the end of each posting)	8%
3.	Professionalism	6%
4.	Log book	6%
5.	AETCOM assessment	5%

Proposal

Sl. No.	Theory		Practical	
1	IA Theory	40	Practical	20
2	End posting assessment (at the end of each posting)	05	Log book and Viva	05
3	Professionalism	05		
4	Total	50	Total	25

The eligibility is calculated by considering the internal assessment/monthly assessment and Professionalism and ethics (**average should be 40% in theory and practical separately and 50% in theory and practical combined**).

Attendance should be **80% separately** in Theory, Practical and AETCOM.

If a student is found not to meet the criteria of eligibility for summative examination, remedial measures in the form of improvement tests/assignments should be given. The student can be allowed to take up summative examination if the remedial measures are fulfilled.

The internal assessment will appear as a separate subheading in the marks card and not be considered for pass criteria of summative examination.

Summative Assessment:**Marks Distribution:**

Sl. No.	Theory	Practical	Viva	Total
Marks	100	80	20	200

Theory: 1 paper of 100 marks

The portions of theory paper:

1st Term: Ear and Oral cavity, Throat, Neck

2nd Term: Larynx, Broncho-esophagology and Rhinology

Pattern of Assessment:

Theory: Maximum marks: 100

Theory paper

Sl. No.	Type of Question	Number	Marks
1	Long Essay	2 X 10	20
2	Short Essay	8 X 5	40
3	Short answer questions	10 X 3	30
4	MCQs	10 X 1	10
5	Total	30	100

Marks Distribution for the various topics in Theory Paper

Sl. No.	Topic	Marks allotted (Version-1)	Marks allotted (Version -2)
1	Diseases of Nose - Acute and Chronic, Fractures of Nose and PNS, Tumours of the nose and Paranasal Sinuses and its Management	18	23
2	Diseases of External Ear, Middle Ear, Inner Ear and its Management and Tumours of the Ear, Temporal bone fractures, Facial nerve anatomy	23	23
3	Diseases of Oral cavity, Throat and Larynx and its management, Tracheostomy, Stridor	20	15
4	Diseases of Nasopharynx, Neck Abscess and its management	14	14
5	Anatomy and Physiology of Ear, Nose, Throat and Anatomy of Neck, Audiology	7	7
6	Broncho-esophagology - diseases and its management	9	9
7	Foreign bodies in ENT, Obstructive Sleep Apnoea (OSA) and Recent Advances	9	9
8	Total	100	100

Practical: Maximum marks: 80

Sl. No.	Assessment type	Marks
1	Clinical Case presentation and Discussion (40X2)	80
Total		80

Viva: Maximum marks: 20

Sl. No.	Viva Section	Marks
1	Instruments	06
2	X-Rays	06
3	Audiology	02
4	ENT viva	06
5	Total	20

Pass Criteria:

The student should secure **40% in each theory paper** and **50% of aggregate of the two papers**.

The student should secure 50% in **practical exam + viva**.

Supplementary Exam:

Supplementary exams will be conducted and results will be declared **within 60** days after announcement of results of main summative examination.

BLUE PRINT FOR PAPER

(If weightage is given to any particular topic in long questions, other topics of similar importance will be compensated for in short essays)

Sl. No	Question							
A	LE	Section/Topic	Anatomy	Physiology		Diseases	Management	
1	LE	Ear/Throat						
2	LE	Nose/larynx						
B	SE	Section/Topic	Anatomy	Physiology	Assessment of system	Diseases	Management	Recent Advances
3	SE	Ear/Nose						
4	SE	Ear /Nose						
5	SE	Ear/nose						
6	SE	Oral cavity						
7	SE	throat						
8	SE	larynx						
9	SE	nasopharynx						
10	SE	bronchoesophagoscopy/OSA						
C	SAQ	Section/Topic						
11	SAQ	Ear						
12	SAQ	Ear						
13	SAQ	Nose						
14	SAQ	Nose						
15	SAQ	oral cavity						
16	SAQ	throat						
17	SAQ	larynx						
18	SAQ	larynx						
19	SAQ	nasopharynx						
20	SAQ	bronchoesophagoscopy/OSA						
D	MCQ	Section/ Topic	Anatomy	Physiology	Assessment of system	Diseases	Management	Recent Advances
21	MCQ	Ear						
22	MCQ	Ear						
23	MCQ	Nose						
24	MCQ	Nose						
25	MCQ	oral cavity						
26	MCQ	throat						
27	MCQ	larynx						

28	MCQ	larynx						
29	MCQ	nasopharynx						
30	MCQ	bronchoesophagoscopy/OSA						

PRACTICAL PORTIONS DISCUSSION

TOPICS FOR MBBS PHASE-III Part 1

DISCUSSION TOPICS ON EAR:

1. History taking and clinical examination
2. Audiology and assessment of hearing
3. Symptomatology in Ear
4. Common diseases of External, Middle and Inner Ear
5. Temporal bone anatomy and osteology
6. Instruments in Ear - OPD and OT
7. Diagnostic Procedures:
 - a. Otoscopy
 - b. Examination under microscope
 - c. Eustachian tube function tests
 - d. X-Rays
8. Surgical Procedures:
 - a. Myringotomy
 - b. Foreign body removal from ear
 - c. Mastoidectomy
 - d. Tympanoplasty
 - e. Stapedotomy

DISCUSSION TOPICS ON NOSE

1. History taking and clinical examination of the nose - anterior and posterior rhinoscopy
2. Diagnostic nasal endoscopy
3. Common diseases of external nose
4. Common diseases of nasal septum
5. Rhinitis - Allergic, Infective and Non-infective
6. Tumours in the nose and Paranasal sinuses
7. Rhinosinusitis
8. Epistaxis and Management - anterior nasal packing, Posterior nasal packing
9. Common surgical Procedures:
 - a. Antral puncture and wash out
 - b. Foreign body removal from nose
 - c. Septoplasty/ Submucosal Resection
 - d. Functional Endoscopic Sinus Surgery
 - e. Fracture nasal bone reduction

DISCUSSION TOPICS ON THROAT

1. Symptomatology of the Throat
2. Examination of Oral cavity, Oropharynx and Laryngopharynx including Indirect laryngoscopy
3. Evaluation of Dysphagia/ Odynophagia
4. Evaluation of Hoarseness of voice

5. Acute and Chronic Tonsillitis
6. Chronic Adenoid Hypertrophy
7. Infective conditions of the larynx and Pharynx
8. Neoplasms of the larynx
9. Airway foreign bodies
10. Assessment of Stridor
11. Instruments for Throat surgery and Adenoids and Tonsils
12. X-Rays in the Head and Neck region
13. Common surgical Procedures:
 - a. Tracheostomy
 - b. Tonsillectomy and Adenoidectomy
 - c. Foreign body removal from the throat
 - d. Esophagoscopy
 - e. Bronchoscopy
 - f. Direct Laryngoscopy

DISCUSSION TOPICS OF HEAD & NECK:

1. Evaluation of neck swellings including thyroid, parotid, lymph node and abscess
2. Head and neck malignancy

MBBS PHASE III PART 1 - ENT INSTRUMENTS

INSTRUMENTS IN OPD AND OT	
1	Bulls' Eye lamp
2	Forehead Mirror
3	Boyle-Davis Mouth Gag
4	Draffin's Bipod Metallic stand
5	Magauran's Plate
6	Denis Browne's Tonsil Holding Forceps
7	Mollison's tonsil dissector with anterior pillar retractor
8	Eve's Tonsillar Snare
9	Burkitt's tonsillar artery forceps
10	Negus' curved tonsillar artery forceps
11	St. Claire Thompsons Adenoid Curette with and without cage
12	Lac's tongue depressor
13	Yankauers' Pharyngeal suction tube
14	Doyen's mouth gag
15	Jenning's mouth gag
16	Thudicum's nasal speculum
17	St. Claire Thompsons long bladed nasal speculum
18	Killian's nasal speculum
19	Killian's gouge
20	Tilley's and Hartmanns Nasal packing forceps
21	Freer's elevator
22	Killian's elevator
23	Howarth's nasal raspatory
24	Citteli's punch
25	Asch's forceps
26	Walsham's forceps
27	Woake's Eustachian tube catheter
28	Tilley's antral harpoon
29	Tilley-Lichtwitz Trocar and Cannula
30	Tilley's Antral rosette burr
31	Ballenger's swivel knife
32	St Claire Thompson's posterior rhinoscopic mirror

33	Mollison's Mastoid retractor
34	Plester-Jensen self Retaining Hemostatic Mastoid Retractor
35	Farabeuf's Mastoid Periosteal elevator
36	Jenkin's Mastoid Chisel
37	Lempert's mastoid curette
38	Metallic ear speculums
39	Lempert's Endaural speculum
40	Drill with burrs
41	Politzer's Myringotome
42	Seigel's pneumatic speculum
43	Jobsons Hornes Probe with Ring curette
44	Aural metallic syringe
45	Esophagoscope (Negus)
46	Chevallier Jackson's Direct laryngoscope
47	Chevallier Jackson's Bronchoscope
48	Cricoid Hook
49	Chevallier Jackson's metallic tracheostomy tube
50	Fuller's metallic tracheostomy tube
51	PVC cuffed and uncuffed tracheostomy tube
52	Trousseau's tracheal dilator
53	Laryngeal Mirror

MBBS PHASE III PART 1

<u>RADIOLOGY</u> <u>AND</u> <u>AUDIOLOGY</u>	
1	Pure tone audiogram
2	Impedence audiogram
3	X-Ray Paranasal sinus - Water's view
4	X-Ray Paranasal sinus - Caldwell's view
5	X-Ray Nasopharynx Lateral view soft tissue
6	X-Ray Mastoid Schuller's view
7	X-Ray Mastoid Law's view
8	X-Ray Mastoid Towne's view
11	Barium swallow
12	X-Ray Neck - AP and Lateral view for foreign bodies
13	X-Ray Nasal bones - lateral view

RECOMMENDED LIST OF TEXTBOOKS:

1. Hazarika P, DR Nayak, R Balakrishnan; Textbook Of Ear Nose Throat And Head Neck Surgery 4Ed 2019: Clinical And Practical. CBS Publishers, New Del
2. Mohan Bansal; Diseases of the Ear, nose and throat; 3rd edition, 2019, Jaypee Publishers
3. Prof. KK Ramalingam, Ravi Ramalingam, B Sreeramamurthy: A short practice of Otorhinolaryngology; 5th edition; All India Publishers and Distributors
4. Logan Turner's, Disease of the Nose, Throat and Ear, Head and Neck Surgery; 11th edition, CRC Press
5. M Maqbool, S Maqbool; Textbook of Ear, Nose and Throat Diseases; 12th edition, Jaypee Publishers
6. Bachi T Hathiram, Vicky S Khatter; Ear, Nose and Throat Simplified; 3rd edition, CBS Publishers
7. An atlas of head and Neck surgery; Lore; W B Saunders
8. Clinical audio/vestibulometry; Anirban Biswas; Bhalani publication house Mumbai
9. Stell and Maran's textbook of head and Neck surgery and oncology Fifth edition; John C Watkinson Ralph W Gilbert
10. Atlas of operative otolaryngology and head neck surgery; Hathiram; Jaypee
11. Anatomical principles Of endoscopic sinus surgery; Renuka Bradoo; Taylor & Francis

FORMAT FOR ASSESSING PROFESSIONALISM

Sl. No.	Overall attendance (5)	Timely submission of logbook /assignments (5)	Behavior towards patients while taking history and examination (5)	Behaves respectfully with peers and teachers (5)
1				
2				
3				

Signature of Faculty mentor

Signature of HOD

Guidelines for assessment:

Attendance

Grade	Percentage
5	95-100%
4	90-94%
3	85-89%
2	80-84%
1	< 80%

Submission of record books /assignments

Grade	Criteria
5	Always submits the record/assignments on time
4	Often submits the record/assignments on time
3	Frequently submits the record/assignments on time
2	Rarely submits the record on time
1	Has not submitted at all

Behaves respectfully with peers and teacher

Grade	Criteria
5	Demonstrates appropriate respectful behavior with peers and teachers always
4	Demonstrates appropriate respectful behavior with peers and teachers most of the time
3	Demonstrates appropriate respectful behavior with peers and teachers frequently
2	Demonstrates appropriate respectful behavior with peers and teachers rarely
1	Is arrogant and disrespectful to peers and teacher

Behavior towards patients while taking history and examination

Grade	Criteria
5	Always demonstrates appropriate respectful and professional behavior with patients
4	Most of the time, demonstrates appropriate respectful and professional behavior with patients
3	Frequently demonstrates appropriate respectful and professional behavior with patients
2	Rarely demonstrates appropriate respectful and professional behavior with patients
1	Is arrogant and disrespectful to patients, acts unprofessional and examines them without obtaining prior consent

SYLLABUS

Competencies in Otorhinolaryngology				
No.	Topic	Competencies	Core	Non-Core
1	Anatomy and Physiology of ear, nose, throat, head & neck	02	02	0
2	Clinical Skills	15	15	0
3	Diagnostic and therapeutic procedures in ENT	06	0	06
4	Management of diseases of ear, nose & throat	53	47	06

Otorhinolaryngology (ENT)

Sl. No.	Competency number	Competency
1	EN1.1	Anatomy and Physiology of ear, nose, throat, head & neck EN 1.1.1: Describe the anatomy of ear EN 1.1.2 Describe the anatomy of nose EN 1.1.3 Describe the anatomy of throat EN 1.1.4 Describe the anatomy of head and neck EN 1.1.5 Describe the physiology of Ear EN 1.1.6 Describe the physiology of Nose EN 1.1.7 Describe the physiology of throat EN 1.1.8 Describe the physiology of Head and neck
2	EN1.2	Describe the pathophysiology of common diseases in ENT 1.2.1 : Describe the pathophysiology of common diseases of the ear 1.2.2 : Describe the pathophysiology of common diseases of the nose 1.2.3 : Describe the pathophysiology of common diseases of the throat 1.2.4 : Describe the pathophysiology of common diseases of the head and neck
3	EN2.1	Elicit document and present an appropriate history in a patient presenting with an ENT complaint
4	EN2.2	Demonstrate the correct use of a headlamp in the examination of the ear, nose and throat
5	EN2.3	Demonstrate the correct technique of examination of the ear including Otoscopy
6	EN2.4	Demonstrate the correct technique of performance and interpret tuning fork tests
7	EN 2.5	Demonstrate the correct technique of examination of the nose & paranasal sinuses including the use of nasal speculum
8	EN2.6	Demonstrate the correct technique of examining the throat including the use of a tongue depressor
9	EN2.7	Demonstrate the correct technique of examination of neck including elicitation of laryngeal crepitus
10	EN2.8	Demonstrate the correct technique to perform and interpret pure tone audiogram & impedance audiogram
11	EN2.9	Choose correctly and interpret radiological, microbiological & histological investigations relevant to the ENT disorders

12	EN2.10	Identify and describe the use of common instruments used in ENT surgery
13	EN2.11	Describe and identify by clinical examination malignant & pre- malignant ENT diseases
14	EN2.12	Counsel and administer informed consent to patients and their families in a simulated environment
15	EN2.13	Identify, resuscitate and manage ENT emergencies in a simulated environment (including tracheostomy, anterior nasal packing, removal of foreign bodies in ear, nose, throat and upper respiratory tract)
16	EN2.14	Demonstrate the correct technique to instilling topical medications into the ear, nose and throat in a simulated environment
17	EN2.15	Describe the national programs for prevention of deafness, cancer, noise & environmental pollution
18	EN3.1	Observe and describe the indications for and steps involved in the performance of Otomicroscopic examination in a simulated environment
19	EN3.2	Observe and describe the indications for and steps involved in the performance of diagnostic nasal Endoscopy

20	EN3.3	Observe and describe the indications for and steps involved in the performance of Rigid/Flexible Laryngoscopy
21	EN3.4	Observe and describe the indications for and steps involved in the removal of foreign bodies from ear, nose & throat
22	EN3.5	Observe and describe the indications for and steps involved in the surgical procedures in ear, nose & throat
23	EN3.6	Observe and describe the indications for and steps involved in the skills of emergency procedures in ear, nose & throat
24	EN4.1	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Otolgia EN4.1.1: List the causes of Otolgia EN4.1.2: Elicit correct history in patients with Otolgia EN4.1.3: Document and present correct history in patients with Otolgia EN4.1.4: Describe the clinical features in a patient presenting with Otolgia EN4.1.5: Choose the correct investigations in a patient presenting with Otolgia EN4.1.6: Describe the principles of management of Otolgia

25	EN4.2	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of diseases of the external Ear EN4.2.1: List the diseases of external ear EN4.2.2: Elicit correct history in patients presenting with disease of the external Ear EN4.2.3: Document and present correct history in patients with diseases of the external Ear EN4.2.4: Describe the clinical features in a patient presenting with diseases of the external Ear EN4.2.5: Choose the correct investigations in a patient presenting with diseases of the external Ear EN4.2.6: Describe the principles of management of diseases of the external Ear
26	EN4.3	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of ASOM EN4.3.1: Elicit correct history in patients presenting with ASOM EN4.3.2: Document and present correct history in patients with ASOM EN4.3.3: Describe the clinical features in a patient presenting with ASOM EN4.3.4: Choose the correct investigations in a patient presenting with ASOM EN4.3.5: Describe the principles of management of ASOM
27	EN4.4	Demonstrate the correct technique to hold visualize and assess the mobility of the tympanic membrane and its mobility and interpret and diagrammatically represent the findings EN4.4.1: Describe the normal appearance of Tympanic membrane EN4.4.2: Demonstrate the correct technique to hold & visualize the tympanic membrane EN4.4.3: Demonstrate the correct technique to assess the mobility of the tympanic membrane EN4.4.4: Interpret and diagrammatically represent the findings of the tympanic membrane assessment
28	EN4.5	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of OME EN4.5.1: Elicit correct history in patients presenting with OME EN4.5.2: Document and present correct history in patients with OME EN4.5.3: Describe the clinical features in a patient presenting with OME EN4.5.4: Choose the correct investigations in a patient presenting with O

		EN4.5.5: Describe the principles of management of OME
29	EN4.6	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Discharging ear EN4.6.1: List the causes of Discharging ear EN4.6.2: Elicit correct history in patients presenting with Discharging ear EN4.6.3: Document and present correct history in patients with Discharging ear EN4.6.4: Describe the clinical features in a patient presenting with Discharging ear EN4.6.5: Choose the correct investigations in a patient presenting with Discharging ear EN4.6.6: Describe the principles of management of Discharging ear
30	EN4.7	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of CSOM EN4.7.1: Elicit correct history in patients presenting with mucosal type of CSOM EN4.7.2: Document and present correct history in patients with mucosal type of CSOM EN4.7.3: Describe the clinical features in a patient presenting with mucosal type of CSOM EN4.7.4: Choose the correct investigations in a patient presenting with mucosal type of CSOM EN4.7.5: Describe the principles of management of mucosal type of CSOM
31	EN4.8	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of squamosal type of CSOM EN4.8.1: Elicit correct history in patients presenting with squamosal type of CSOM EN4.8.2: Document and present correct history in patients with squamosal type of CSOM EN4.8.3: Describe the clinical features in a patient presenting with squamosal type of CSOM EN4.8.4: Choose the correct investigations in a patient presenting with squamosal type of CSOM EN4.8.5: Describe the principles of management of squamosal type of CSOM

32	EN4.9	Demonstrate the correct technique for syringing wax from the ear in a simulated environment EN4.9.1: Describe the correct technique for syringing wax from the ear EN4.9.2: Demonstrate the correct technique for syringing wax from the ear in a simulated environment
33	EN4.10	Observe and describe the indications for and steps involved in myringotomy and myringoplasty EN4.10.1: Enumerate the indications for myringotomy EN4.10.2: Describe the steps of myringotomy EN4.10.3: Observe steps involved in myringotomy EN4.10.4: Enumerate the indications for myringoplasty EN4.10.5: Describe the steps of myringoplasty EN4.10.6: Observe steps involved in myringoplasty
34	EN4.11	Enumerate the indications, describe the steps and observe a mastoidectomy EN4.11.1: Enumerate the indications for Mastoidectomy EN4.11.2: Describe the steps of Mastoidectomy EN4.11.3: Observe steps involved in Mastoidectomy
35	EN4.12	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Hearing loss EN4.12.1: List the causes of Hearing loss EN4.12.2: Elicit correct history in patients presenting with Hearing loss EN4.12.3: Document and present correct history in patients with Hearing loss EN4.12.4: Describe the clinical features in a patient presenting with Hearing loss EN4.12.5: Choose the correct investigations in a patient presenting with Hearing loss EN4.12.6: Describe the principles of management of Hearing loss
36	EN4.13	Describe the clinical features, investigations and principles of management of Otosclerosis EN4.13.1: Describe the clinical features of Otosclerosis EN4.13.2: Describe the investigations required for patient with Otosclerosis EN4.13.3: Describe the principles of management of Otosclerosis
37	EN4.14	Describe the clinical features, investigations and principles of management of Sudden Sensorineural Hearing Loss

		EN4.14.1: Describe the clinical features of Sudden Sensorineural Hearing Loss EN4.14.2: Describe the investigations required for patient presenting with Sudden Sensorineural Hearing Loss EN4.14.3: Describe the principles of management of Sudden Sensorineural Hearing Loss
38	EN4.15	Describe the clinical features, investigations and principles of management of Noise Induced Hearing Loss EN4.15.1: Describe the clinical features of Noise Induced Hearing Loss EN4.15.2: Describe the investigations required for patient presenting with Noise Induced Hearing Loss EN4.15.3: Describe the principles of management of Noise Induced Hearing Loss
39	EN 4.16	Observe and describe the indications for and steps involved in the performance of pure tone audiometry EN4.16.1: Enumerate the indications for pure tone audiometry EN4.16.2: Describe the steps involved in the performance of pure tone audiometry EN4.16.3: Observe the steps involved in the performance of pure tone audiometry
40	EN4.17	Enumerate the indications and interpret the results of an audiogram EN4.17.1: Enumerate the indications for an audiogram EN4.17.2: Interpret the results of an audiogram
41	EN4.18	Describe the clinical features, investigations and principles of management of Facial Nerve palsy EN4.18.1: Describe the clinical features of Facial Nerve palsy EN4.18.2: Describe the investigations required for patient presenting with Facial Nerve palsy EN4.18.3: Describe the principles of management of Facial Nerve palsy
42	EN4.19	Describe the clinical features, investigations and principles of management of Vertigo EN4.19.1: Describe the clinical features of patient presenting with Vertigo EN4.19.2: Describe the investigations required for patient presenting with Vertigo EN4.19.23: Describe the principles of management of Vertigo

43	EN4.20	Describe the clinical features, investigations and principles of management of Meniere's Disease EN4.20.1: Describe the clinical features of patient presenting with Meniere's Disease EN4.20.2: Describe the investigations required for patient presenting with Meniere's Disease EN4.20.3: Describe the principles of management of Meniere's Disease
44	EN4.21	Describe the clinical features, investigations and principles of management of Tinnitus EN4.21.1: Describe the clinical features of patient presenting with Tinnitus EN4.21.2: Describe the investigations required for patient presenting with Tinnitus EN4.21.3: Describe the principles of management of Tinnitus
45	EN4.22	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Nasal Obstruction EN4.22.1: List the causes of Nasal obstruction EN4.22.2: Elicit correct history in patients presenting with Nasal obstruction EN4.22.3: Document and present correct history in patients with Nasal obstruction EN4.22.4: Describe the clinical features in a patient presenting with Nasal obstruction EN4.22.5: Choose the correct investigations in a patient presenting with Nasal obstruction EN4.22.6: Describe the principles of management of Nasal obstruction
46	EN4.23	Describe the clinical features, investigations and principles of management of DNS EN4.23.1: Describe the clinical features of patient presenting with DNS EN4.23.2: Describe the investigations required for patient presenting with DNS EN4.23.3: Describe the principles of management of DNS
47	EN4.24	Enumerate the indications observe and describe the steps in Septoplasty EN4.24.1: Enumerate the indications for septoplasty

		EN4.24.2: Describe the steps of septoplasty EN4.24.3: Observe steps involved in Septoplasty
48	EN4.25	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Nasal Polyps EN4.25.1: Elicit correct history in patients presenting with Nasal polyps EN4.25.2: Document and present correct history inpatients with Nasal polyps EN4.25.3: Describe the clinical features in a patientpresenting with Nasal polyps EN4.25.4: Choose the correct investigations in a patientpresenting with Nasal polyps EN4.25.5: Describe the principles of management ofNasal polyps
49	EN4.26	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Adenoids EN4.26.1: Elicit correct history in patients presentingwith Nasal polyps EN4.26.2: Document and present correct history inpatients with Nasal polyps EN4.26.3: Describe the clinical features in a patientpresenting with Nasal polyps EN4.26.4: Choose the correct investigations in a patientpresenting with Nasal polyps EN4.26.5: Describe the principles of management of Nasal polyps
50	EN4.27	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Allergic Rhinitis EN4.27.1: Elicit correct history in patients presentingwith Allergic Rhinitis EN4.27.2: Document and present correct history inpatients with Allergic Rhinitis EN4.27.3: Describe the clinical features in a patientpresenting with Allergic Rhinitis EN4.27.4: Choose the correct investigations in a patientpresenting with Allergic Rhinitis EN4.27.5: Describe the principles of management ofAllergic Rhinitis

51	EN4.28	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Vasomotor Rhinitis EN4.28.1: Elicit correct history in patients presenting with Vasomotor Rhinitis EN4.28.2: Document and present correct history in patients with Vasomotor Rhinitis EN4.28.3: Describe the clinical features in a patient presenting with Vasomotor Rhinitis EN4.28.4: Choose the correct investigations in a patient presenting with Vasomotor Rhinitis EN4.28.5: Describe the principles of management of Vasomotor Rhinitis
52	EN4.29	Elicit, document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Acute & Chronic Rhinitis EN4.29.1: Elicit correct history in patients presenting with Acute Rhinitis EN4.29.2: Document and present correct history in patients with Acute Rhinitis EN4.29.3: Describe the clinical features in a patient presenting with Acute Rhinitis EN4.29.4: Choose the correct investigations in a patient presenting with Acute Rhinitis EN4.29.5: Describe the principles of management of Acute Rhinitis EN4.29.6: Elicit correct history in patients presenting with Chronic Rhinitis EN4.29.7: Document and present correct history in patients with Chronic Rhinitis EN4.29.8: Describe the clinical features in a patient presenting with Chronic Rhinitis EN4.29.9: Choose the correct investigations in a patient presenting with Chronic Rhinitis EN4.29.10: Describe the principles of management of Chronic Rhinitis
53	EN4.30	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Epistaxis EN4.30.1: Enumerate the causes of Epistaxis EN4.30.2: Elicit correct history in patients presenting with Epistaxis EN4.30.3: Document and present correct history in patients with Epistaxis EN4.30.4: Describe the clinical features in a patient presenting with Epistaxis EN4.30.5: Choose the correct investigations in a patient presenting with Epistaxis

		EN4.30.6: Describe the principles of management of Epistaxis
54	EN4.31	Describe the clinical features, investigations and principles of management of trauma to the face & neck EN4.31.1: Describe the clinical features in a patient presenting with trauma to face EN4.31.2: Choose the correct investigations in a patient presenting with trauma to face EN4.31.3: Describe the principles of management of trauma to face EN4.31.4: Describe the clinical features in a patient presenting with trauma to neck EN4.31.5: Choose the correct investigations in a patient presenting with trauma to neck EN4.31.6: Describe the principles of management of trauma to neck
55	EN4.32	Describe the clinical features, investigations and principles of management of nasopharyngeal Angiofibroma EN4.32.1: Describe the clinical features in a patient presenting with nasopharyngeal Angiofibroma EN4.32.2: Choose the correct investigations in a patient presenting with nasopharyngeal Angiofibroma EN4.32.3: Describe the principles of management of nasopharyngeal Angiofibroma
56	EN4.33	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Acute & Chronic Sinusitis EN4.33.1: Elicit correct history in patients presenting with Acute Sinusitis EN4.33.2: Document and present correct history in patients with Acute Sinusitis EN4.33.3: Describe the clinical features in a patient presenting with Acute Sinusitis EN4.33.4: Choose the correct investigations in a patient presenting with Acute Sinusitis EN4.33.5: Describe the principles of management of Acute Sinusitis EN4.33.6: Elicit correct history in patients presenting with Chronic Sinusitis EN4.33.7: Document and present correct history in patients with Chronic Sinusitis EN4.33.8: Describe the clinical features in a patient presenting with Chronic Sinusitis EN4.33.9: Choose the correct investigations in a patient presenting with

		Chronic Sinusitis EN4.33.10: Describe the principles of management of Chronic Sinusitis
57	EN4.34	Describe the clinical features, investigations and principles of management of Tumors of Maxilla EN4.34.1: Describe the clinical features in a patient presenting with Tumors of Maxilla EN4.34.2: Choose the correct investigations in a patient presenting with Tumors of Maxilla EN4.34.3: Describe the principles of management of Tumors of Maxilla
58	EN4.35	Describe the clinical features, investigations and principles of management of Tumors of Nasopharynx EN4.35.1: Describe the clinical features in a patient presenting with Tumors of Nasopharynx EN4.35.2: Choose the correct investigations in a patient presenting with Tumors of Nasopharynx EN4.35.3: Describe the principles of management of Tumors of Nasopharynx
59	EN4.36	Describe the clinical features, investigations and principles of management of diseases of the Salivary glands EN4.36.1: Describe the clinical features in a patient presenting with Diseases of salivary glands EN4.36.2: Choose the correct investigations in a patient presenting with Diseases of salivary glands EN4.36.3: Describe the principles of management of Diseases of salivary glands
60	EN4.37	Describe the clinical features, investigations and principles of management of Ludwig's angina EN4.37.1: Describe the clinical features in a patient presenting with Ludwig's angina EN4.37.2: Choose the correct investigations for a patient presenting with Ludwig's angina EN4.37.3: Describe the principles of management of Ludwig's angina

61	EN4.38	Elicit document and present a correct history demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of type of dysphagia EN4.38.1: Enumerate the causes of Dysphagia EN4.38.2: Elicit correct history in patients presenting with Dysphagia EN4.38.3: Document and present correct history in patients with Dysphagia EN4.38.4: Describe the clinical features in a patient presenting with Dysphagia EN4.38.5: Choose the correct investigations for a patient presenting with Dysphagia EN4.38.6: Describe the principles of management of Dysphagia
62	EN4.39	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Acute & Chronic Tonsillitis EN4.39.1: Elicit correct history in patients presenting with Acute Tonsillitis EN4.39.2: Document and present correct history in patients with Acute Tonsillitis EN4.39.3: Describe the clinical features in a patient presenting with Acute Tonsillitis EN4.39.4: Choose the correct investigations in a patient presenting with Acute Tonsillitis EN4.39.5: Describe the principles of management of Acute Tonsillitis EN4.39.6: Elicit correct history in patients presenting with Chronic Tonsillitis EN4.39.7: Document and present correct history in patients with Chronic Tonsillitis EN4.39.8: Describe the clinical features in a patient presenting with Chronic Tonsillitis EN4.39.9: Choose the correct investigations in a patient presenting with Chronic Tonsillitis EN4.39.10: Describe the principles of management of Chronic Tonsillitis
63	EN4.40	Observe and describe the indications for and steps involved in a tonsillectomy / adenoidectomy EN4.40.1: Enumerate the indications for tonsillectomy EN4.40.2: Observe the steps involved in a tonsillectomy EN4.40.3: Describe the steps involved in a tonsillectomy EN4.40.4: Enumerate the indications for adenoidectomy EN4.40.5: Observe the steps involved in an adenoidectomy EN4.40.6: Describe the steps involved in an adenoidectomy

64	EN4.41	Describe the clinical features, investigations and principles of management of Acute & chronic abscesses in relation to Pharynx EN4.41.1: List the abscesses in relation to pharynx EN4.41.2: Describe the clinical features of acute abscesses in relation to pharynx EN4.41.3: Choose the correct investigations in a patient presenting with an acute abscess related to the pharynx EN4.41.4: Describe the principles of management of a patient presenting with an acute abscess related to the pharynx EN4.41.5: Describe the clinical features of chronic abscesses in relation to pharynx EN4.41.6: Choose the correct investigations in a patient presenting with chronic abscess related to the pharynx EN4.41.7: Describe the principles of management of a patient presenting with chronic abscess related to the pharynx
65	EN4.42	Elicit, document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of hoarseness of voice EN4.42.1: Enumerate the causes of hoarseness of voice EN4.42.2: Elicit correct history in patients presenting with hoarseness of voice EN4.42.3: Document and present correct history in patients with hoarseness of voice EN4.42.4: Describe the clinical features in a patient presenting with hoarseness of voice EN4.42.5: Choose the correct investigations for a patient presenting with hoarseness of voice EN4.42.6: Describe the principles of management of a patient with hoarseness of voice
66	EN4.43	Describe the clinical features, investigations and principles of management of Acute & Chronic Laryngitis EN4.43.1: Describe the clinical features in a patient presenting with Acute Laryngitis EN4.43.2: Choose the correct investigations in a patient presenting with Acute Laryngitis EN4.43.3: Describe the principles of management of Acute Laryngitis EN4.43.4: Describe the clinical features in a patient presenting with Chronic

		Laryngitis EN4.43.5: Choose the correct investigations in a patient presenting with Chronic Laryngitis EN4.43.6: Describe the principles of management of Chronic Laryngitis
67	EN4.44	Describe the clinical features, investigations and principles of management of benign lesions of the vocal cord EN4.44.1: Enumerate the benign lesions of the vocal cord EN4.44.2: Describe the clinical features in a patient presenting with benign lesions of the vocal cord EN4.44.3: Choose the correct investigations for a patient presenting with benign lesions of the vocal cord EN4.44.4: Describe the principles of management of benign lesions of the vocal cord
68	EN4.45	Describe the clinical features, investigations and principles of management of Vocal cord palsy EN4.45.1: Enumerate the causes of Vocal cord palsy EN4.45.2: Describe the clinical features in a patient presenting with Vocal cord palsy EN4.45.3: Choose the correct investigations for a patient presenting with Vocal cord palsy EN4.45.4: Describe the principles of management of Vocal cord palsy
69	EN4.46	Describe the clinical features, investigations and principles of management of Malignancy of the Larynx & Hypopharynx EN4.46.1: Describe the clinical features in a patient presenting with Malignancy of the Larynx EN4.46.2: Choose the correct investigations for a patient presenting with Malignancy of the Larynx EN4.46.3: Describe the principles of management of Malignancy of the Larynx EN4.46.4: Describe the clinical features in a patient presenting with Malignancy of the Hypopharynx EN4.46.4: Choose the correct investigations for a patient presenting with Malignancy of the Hypopharynx EN4.46.5: Describe the principles of management of Malignancy of the Hypopharynx

70	EN4.47	Describe the clinical features, investigations and principles of management of Stridor EN4.47.1: Enumerate the causes of Stridor EN4.47.2: Describe the clinical features in a patient presenting with Stridor EN4.47.3: Choose the correct investigations for a patient presenting with Stridor EN4.47.4: Describe the principles of management of Stridor
71	EN4.48	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of Airway Emergencies EN4.48.1: Enumerate the causes of Airway emergencies EN4.48.2: Elicit correct history in patients presenting with Airway emergencies EN4.48.3: Document and present correct history in patients with Airway emergencies EN4.48.4: Describe the clinical features in a patient presenting with Airway emergencies EN4.48.5: Choose the correct investigations for a patient presenting with Airway emergencies EN4.48.6: Describe the principles of management of airway emergencies
72	EN4.49	Elicit document and present a correct history, demonstrate and describe the clinical features, choose the correct investigations and describe the principles of management of foreign bodies in the air & food passages EN4.49.1: Elicit correct history in patients presenting with foreign bodies in the air passages EN4.49.2: Document and present correct history in patients presenting with foreign bodies in the air passages EN4.49.3: Describe the clinical features in a patient presenting with foreign bodies in the air passages EN4.49.4: Choose the correct investigations in a patient presenting with foreign bodies in the air passages EN4.49.5: Describe the principles of management of foreign bodies in the air passages EN4.49.6: Elicit correct history in patients presenting with foreign bodies in the food passages EN4.49.7: Document and present correct history in patients presenting with foreign bodies in the food passages EN4.49.8: Describe the clinical features in a patient presenting with foreign bodies in the food passages EN4.49.9: Choose the correct investigations in a patient presenting with foreign bodies in the food passages

		EN4.49.10: Describe the principles of management of foreign bodies in the food passages
73	EN4.50	Observe and describe the indications for and steps involved in tracheostomy EN4.50.1: Enumerate the indications for Tracheostomy EN4.50.2: Observe steps involved in Tracheostomy EN4.50.3: Describe the steps of Tracheostomy
74	EN4.51	Observe and describe the care of the patient with a tracheostomy EN4.51.1: Observe steps involved in care of the patient with a tracheostomy EN4.51.2: Describe the steps involved in care of the patient with a tracheostomy
75	EN4.52	Describe the Clinical features, Investigations and principles of management of diseases of Oesophagus EN4.52.1: Enumerate the Diseases of Oesophagus EN4.52.2: Describe the clinical features in a patient presenting with Disease of Oesophagus EN4.52.3: Choose the correct investigations for a patient presenting with Disease of Oesophagus EN4.52.4: Describe the principles of management of Diseases of Oesophagus
76	EN4.53	Describe the clinical features, investigations and principles of management of HIV manifestations of the ENT EN4.53.1: Enumerate the HIV manifestations of the ENT EN4.53.2: Describe the clinical features in a patient presenting with HIV manifestations of the ENT EN4.53.3: Choose the correct investigations for a patient presenting with HIV manifestations of the ENT EN4.53.4: Describe the principles of management of HIV manifestations of the ENT

INTEGRATION TOPICS

Sl. No.	Topic for integration	Subject [Competencies]
1	Describe the Anatomy of Ear, Skull and Temporal bone	ENT EN1.1 Anatomy AN 40.1
2	Describe the Anatomy and Physiology of Pharynx (naso,oro,hypo)	ENT EN 1.1 Anatomy AN 36.1
3	Anatomy of Fascial spaces of Neck	ENT EN 1.1 Anatomy AN 35.10
4	Describe the Anatomy and Physiology of Larynx	ENT EN 1.1 Anatomy AN 38.1
5	Describe the Anatomy of Nose and PNS	ENT EN 1.1 Anatomy AN 37.1
6	Describe the pathophysiology of common diseases in ENT	ENT EN1.2 Pathology PA 8.2
7	Describe the clinical features, investigations and principles of management of HIV manifestations of the	ENT EN4.53 Medicine IM 6.1
8	Describe the national programs for prevention of deafness, cancer, noise & environmental pollution	ENT EN2.15 Community Medicine CM 3.1

AETCOM – 5 hours

Sl. No.	Competency
1.	Enumerate and describe professional qualities and roles of a physician
2.	Describe and discuss the commitment to lifelong learning as an important part of physician growth.
3.	Describe and discuss the role of a physician in health care system
4.	Identify and discuss physician's role and responsibility to society and the community that she/ he serves

15 DAYS COMPULSORY POSTING IN OTORHINOLARYNGOLOGY (ENT) INTERSHIP

At the end of the posting, the student should possess the following skills:

1. Skills in use of the head mirror, Otoscope and Indirect laryngoscope - Perform independently
2. Ear syringing, Antral procedures and nasal packing for epistaxis - Perform under assistance
3. Nasal douching and packing of the external ear canal, aural and nasal suctioning - Perform under assistance
4. Removal of foreign bodies from the ear and nose - Observe and perform under assistance
5. Endoscopic procedures and tracheostomy - Observe and assist
6. Audiological assessment - Observe and assist
7. Community diagnosis of CSOM, National program on prevention of Deafness, Rehabilitation programs related to ENT conditions - Observe and assist

Assessment: Daily observation and assessment based on the above, scoring to be done at the end of the posting out of a total of 50 marks



Curriculum for OBSTETRICS & GYNAECOLOGY 2022



**Ramaiah Medical College
Ramaiah University of Applied
Sciences
Bengaluru-560054**

INTRODUCTION TO THE DEPARTMENT



The Department of Obstetrics & Gynecology has state of the art facilities, offering equal opportunity to all to study Obstetrics & Gynecology creating a conducive environment. The Department educates and inspires the students to practice Obstetrics & Gynecology by providing quality training and research.

Teaching staff comprises of qualified Gynecologists, training students with various clinical situations that they may face in their professional career. The department renders round the clock emergency services, to handle all complicated deliveries. The department has modern amenities and infrastructure including departmental museum, library, state of the art labor room, high dependency unit.

Students are trained to acquire knowledge of anatomy, physiology, pathophysiology of the reproductive system. They are trained to witness normal and complicated deliveries and also management of puerperial problems. They are trained about gynecological diseases which includes examination, medical and surgical management.

AIM:

Impart quality education through teaching and research.

GOAL:

The broad goal of the teaching of undergraduate students in Obstetrics & Gynecology is that he/she shall acquire understanding of anatomy, physiology and pathophysiology of the reproductive system and gain the ability to optimally manage common conditions affecting it.

COGNITIVE DOMAIN :

1. Describe the structure of placenta .
2. Enumerate the morphology of uterus , tubes and ovaries.
3. Describe the development of female reproductive organs.
4. Describe the bones in the formation of pelvis.
5. Describe the foetal skull.
6. 6. Describe the blood supply , nerve supply and lymphatic drainage of - uterus , ovaries and fallopian tubes.

1. Enumerate the importance of history taking in obstetrics and gynaecology.
2. Importance of pre-pregnancy counselling and counselling for surgery.
3. Medical legal issue in obstetrics and gynaecology.
4. Importance of ethics.
5. Management of medical disorders in pregnancy.

PSYCHOMOTOR DOMAIN :

1. Demonstrate the mechanism of labour.
2. Demonstrate the method of delivery by vaginal route and caesarean route.
3. Describe the minor operative procedures in gynaecology.
4. Mention complications in early pregnancy and management.

(a) Competencies in Obstetrics: The student must demonstrate ability to:

1. Provide peri-conceptional counseling and antenatal care,
2. Identify high-risk pregnancies and refer appropriately,
3. Conduct normal deliveries, using safe delivery practices in the primary and secondary care settings,
4. Prescribe drugs safely and appropriately in pregnancy and lactation,
5. Diagnose complications of labor, institute primary care and refer in a timely manner,
6. Perform early neonatal resuscitation,
7. Provide postnatal care, including education in breast-feeding,
8. Counsel and support couples in the correct choice of contraception
9. Interpret test results of laboratory and radiological investigations as they apply to the care of the obstetric patient,
10. Apply medico-legal principles as they apply to tubectomy, Medical Termination of Pregnancy (MTP), Pre conception and Prenatal Diagnostic Techniques (PC PNDT Act) and other related Acts.

Competencies in Gynecology: The student must demonstrate ability to:

1. Elicit a gynecologic history, perform appropriate physical and pelvic examinations and PAP smear in the primary care setting,
2. Recognize, diagnose and manage common reproductive tract infections in the primary care setting,
3. Recognize and diagnose common genital cancers and refer them appropriately.

(b) Integration: The teaching should be aligned and integrated horizontally and vertically in order to provide



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comprehensive care for women in their reproductive years and beyond, based on a sound knowledge of structure, functions and disease and their clinical, social, emotional, psychological correlates in the context of national health priorities.

Sl.no	Teaching & Learning method
1	Interactive Lectures
2	Small group teaching / Tutorials
3	Bed side Clinics / Grand Rounds in the wards
4	Skill Lab

TEACHING METHODS & HOURS

	Large group Teaching	Small group teaching/Practical/Tutorials	SDL	AETCOM	Total	Clinical/Field Posting
2nd	25 hours	--	--	--	--	4 weeks
3 rd Part I	25 hours	35 hours	5 hours		65 hours	4 weeks
3 rd Part II	70 hours	125 hours	15 hours		210 hours	12weeks
Total	120hours	160 hours	20 hours		275 hours	20 weeks

COMPETENCIES:

- Period of Training – Phase II Part 1 – 3rd and 4th term
Phase II Part 1 – 5th and 6th term
Phase III Part 2 - 7th, 8th and 9th term

- **II MBBS & Phase III part**

- Appreciate the principles of reproductive anatomy and physiology
- Understand the preconception, antenatal, intra natal and post natal factors that affect mother and fetus.
- Impart antenatal care and detect deviation from normal pregnancy.
- Know the pathology of menstrual abnormalities and management.
- Know about benign and malignant tumors of the genital tract including screening.

Period of training during internship-

As an intern must be able to perform or assist

- normal labour and episiotomy
- post partum family planning measures
- assist in caesarean deliveries and minor operative procedures

Certifiable Procedural skills desirable

- Documentation of antenatal history. (I)
- Diagnosis of normal pregnancy. (D)
- Conduction of normal delivery. (D)
- To independently take pap smear. (I)

I – Independently performed on patients

D – Demonstration on patients or simulations and performance under supervision in patients

COURSE OUTCOME

At the end of the course, the following outcome is expected from the student which includes the knowledge, attitude and skill developed during the course

OBSTETRICS:

1. To diagnose normal pregnancy, provide antenatal care and to identify high risk pregnancy
2. Monitoring of the mother and fetus during labour and identify abnormal labor ,Skill to conduct vaginal delivery, care of new born, management of postpartum haemorrhage.
3. To know about various health programs and their implementation at the National level.

GYNAECOLOGY:

1. To have knowledge of the benign and malignant conditions that affect the female genital tract.
2. Screening of genital tract malignancy .Skill to perform PAP Smear.
3. Knowledge of various contraceptive methods (Skill to insert and remove Intra uterine Device) , MTP (regulations and different method of MTP)and the skill to counsel the same

SYLLABUS

4TH TERM :

- OG 1.1, 1.2 Define and discuss birth rate, maternal mortality and morbidity, define and discuss perinatal mortality and morbidity including perinatal and neonatal mortality and morbidity audit.
- OG 3.1 Describe the physiology of ovulation, menstruation, fertilization, implantation and gametogenesis.
- OG 4.1 Describe and discuss the basic Embryology of fetus, factors influencing of fetal



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growth and development, anatomy and physiology of placenta and teratogenesis.

- OG 7.1 Describe and discuss the changes in the genital tract, Cardiovascular system, Respiratory, Hematology, Renal and gastrointestinal system in pregnancy
- Internal assessment
- OG 8.7 Enumerate the indications and types of vaccination in pregnancy
- OG 8.8 Enumerate the indications and describe the investigations including the use of ultrasound in the initial assessment and monitoring in pregnancy.
- OG 9.1 Classify, define and discuss the etiology and management of abortions including threatened, inevitable, missed and septic.
- OG 9.5 Describe the Etiopathology, impact on maternal and fetal health and principles of management of hyperemesis gravidarum.
- OG 22.1 Describe the clinical characteristics of physiological vaginal discharge.
- OG 27.1 Describe and discuss the etiology, pathology, clinical features and differential diagnosis, investigations, management and long term implications of sexually transmitted infections
- OG 27.2 Describe and discuss the etiology, pathology, clinical features and differential diagnosis, investigations, management and long term implications of genital tuberculosis.
- OG 27.4 Describe and discuss the etiology, pathology, clinical features and differential diagnosis, investigations, management and long term implications of Pelvic inflammatory disease.

6th TERM :

- OG 12.2 Anemia in pregnancy definition, classification and pathophysiology, diagnosis, investigations and adverse effects on fetus and mother, management during pregnancy and labor including complications.
- OG 16.1 PPH – Causes, diagnosis, management and use of blood and blood products,



- OG 27.3 HIV - etiology, pathology, clinical features, differential diagnosis.
- OG 12.7 Screening risk factors and management of mother and new born with HIV.
- OG 22.2 Abnormal vaginal discharge, etiology, characteristics, clinical diagnosis, investigations and management (Specially candida, trichomoniasis, bacterial vaginosis).
- OG 27.1 Management and complications and long term implications of STI.
- OG 27.2 Etiology, pathology, clinical features and differential diagnosis , management and long term implications of genital TB.
- OG 27.4 Etiology, pathology, clinical features and differential diagnosis , investigations and long term implications of PID.
- OG 24.1 AUB – Define, classify, discuss its etiology, clinical features, investigations, diagnosis and management.
- OG 29.1 Fibroid uterus – describe and discuss its etiology, pathology, clinical features, differential diagnosis of fibroid uterus.
- OG 21.1, 21.2 Describe and discuss temporary and permanent methods of contraception, indications, technique and complications of OCP, describe and discuss PPIUCD programme.
- OG 28.1 Infertility – describe and discuss the common causes, pathogenesis and clinical features./
- OG 25.1 Primary amenorrhoea – describe and discuss causes, investigations and principles of management of primary amenorrhoea.

7 TH TERM

		TOPIC – Complications in early pregnancy 7Hr		
14	OG9.1	Classify, define and discuss the aetiology and management of abortions including threatened, incomplete, inevitable, missed and septic.	LGT	
15	OG9.1.1	Recurrent pregnancy Loss	LGT	
16	OG20.1 OG20.3	Enumerate the indications and describe and discuss the legal aspects, indications, methods for first and second trimester MTP; complications and management of complications of Medical Termination of Pregnancy. MTP & PCPNDT ACT	LGT	
17	OG9.3	Discuss the aetiology, clinical features, differential diagnosis of acute abdomen in early pregnancy (with a focus on ectopic pregnancy).	LGT	
18	OG9.3.1	Enumerate the principles of medical and surgical management.	LGT	
19	OG9.4	Discuss the clinical features, laboratory investigations, ultrasonography, differential diagnosis, principles of management and follow up of Molar pregnancy.	LGT	
20	OG9.5	Describe the etiopathology, impact on maternal and fetal health and principles of management of hyperemesis gravidarum	LGT	
		TOPIC – VAGINAL DISCHARGE 2Hr		
21	OG22.1	Describe the clinical characteristics of physiological vaginal discharge.	LGT	
22	OG22.2	Describe and discuss the etiology (with special emphasis on Candida, T. vaginalis, bacterial vaginosis), characteristics, clinical diagnosis, investigations, genital hygiene, management of common causes and the syndromic management	LGT	
		TOPIC – Genital Infections 3Hr		
23	OG27.1	Describe and discuss the etiology, pathology, clinical features, differential diagnosis, investigations, management and long term implications of sexually transmitted infections.	LGT	
24	OG27.2 OG27.4	Describe and discuss the etiology, pathology, clinical features, differential diagnosis, investigations, management and long term implications of genital tuberculosis. Describe and discuss the etiology, pathology, clinical features, differential diagnosis, investigations, management and long term implications of Pelvic Inflammatory Disease.	LGT	
25	OG27.3	Describe and discuss the etiology, pathology, clinical features, differential diagnosis, investigations, management and long term implications of HIV.	LGT	
LGT- 25 hours			Total=25hrs	
2nd Internal assessment examination				
2nd Professional MBBS Examination				

8 TH TERM -

0610.1 Define, classify and describe the aetiology, pathogenesis, clinical features, ultrasonography, differential diagnosis and management of antepartum haemorrhage in pregnancy. (Placenta previa)

OG10.1.1 Define, classify and describe the aetiology, pathogenesis, clinical features, ultrasonography, differential diagnosis and management of antepartum haemorrhage in pregnancy. (Abruptio Placenta)

7 OG10.1.2 Placenta previa SGT

8 OG10.1.3 Abruptio Placenta SGT

9 OG10.2.1 Enumerate the indications and describe the appropriate use of blood and blood products, their complications and management.

TOPIC – Multiple Pregnancies 2Hr + 2Hr

10 OG11.1 Describe the etiopathology, clinical features; diagnosis and investigations, complications, principles of management of multiple pregnancies

11 OG11.1.1 Multiple Pregnancy SGT

12 OG11.1.2 Amniotic fluid disorder LGT

13 OG11.1.3 Amniotic fluid disorder SGT

TOPIC–Medical disorders in Pregnancy 14Hr+14Hr

14 OG12.1 Define, classify and describe the etiology and pathophysiology, early detection OF Hypertensive disorders in pregnancy.

15 OG12.1.1 Investigations; principles of management of hypertensive disorders of pregnancy and eclampsia, complications of eclampsia.

14 OG12.1 Define, classify and describe the etiology and pathophysiology, early detection OF Hypertensive disorders in pregnancy.

15 OG12.1.1 Investigations; principles of management of hypertensive disorders of pregnancy and eclampsia, complications of eclampsia.

16 OG12.1.2 Discuss the etiology ,risk factors, prevention and management of Hypertensive disorders in pregnancy.

17 OG12.2 Define, classify and describe the etiology, pathophysiology, diagnosis, investigations of anemia in pregnancy.

19 OG12.2.1 Adverse effects on the mother and foetus and the management during pregnancy and labor, and complications of anemia in pregnancy.

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20 OG12.2 Define, classify and describe the etiology, pathophysiology, diagnosis, investigations of anemia in pregnancy.
SGT

21 OG12.2.1 Adverse effects on the mother and foetus and the management during pregnancy and labor, and complications of anemia in pregnancy.

22 OG12.2.2 Discuss the etiology,types,complications,prevention and management of anemia in pregnancy.

- 23 OG12.3 Define, classify and describe the etiology, pathophysiology, diagnosis, investigations of diabetes in pregnancy
- 24 OG12.3.1 Criteria, adverse effects on the mother and foetus and the management during pregnancy and labor, and complications of diabetes in pregnancy.
- 25 OGT2.3 Define, classify and describe the etiology, pathophysiology, diagnosis, investigations of diabetes in pregnancy.
- 26 OG12.3.1 Criteria, adverse effects on the mother and foetus and the management during pregnancy and labor, and complications of diabetes in pregnancy.
- 27 OG12.3.2 Discuss the risk factors, diagnosis, fetal maternal complications and management of GDM.
- SDL
- 28 OG12.4 Define, classify and describe the etiology, pathophysiology, diagnosis, investigations of heart diseases in pregnancy.
- 29 OG12.4.1 Criteria, adverse effects on the mother and foetus and the management during pregnancy and labor, and complications of heart diseases in pregnancy.
- 30 OG12.4 Define, classify and describe the etiology, pathophysiology, diagnosis, investigations of heart diseases in pregnancy.
- 31 OG12.4.1 Criteria, adverse effects on the mother and foetus and the management during pregnancy and labor, and complications of heart diseases in pregnancy.
- 32 OG12.4.2 Discuss the fetal maternal complications and management of heart disease in pregnancy.
- 33 OG12.5 Describe the clinical features, detection, effect of pregnancy on the disease and impact of the disease on pregnancy complications and management of urinary tract infections in pregnancy
- 34 OG12.5.1 Describe the clinical features, detection, effect of pregnancy on the disease and impact of the disease on pregnancy complications and management of urinary tract infections in pregnancy
- 35 OG12.6 Describe the clinical features, detection, effect of pregnancy on the disease and impact of the disease on pregnancy complications and management of liver disease in pregnancy
- 36 OG12.6.1 Describe the clinical features, detection, effect of pregnancy on the disease and impact of the disease on pregnancy complications and management of liver disease in pregnancy
- 37 OG12.7 Describe and discuss screening, risk factors, management of mother and newborn with HIV
- 38 OG12.7.1 Describe and discuss screening, risk factors, management of mother and newborn with HIV
- 39 OG12.8 Describe the mechanism, prophylaxis, fetal complications of isoimmunization in pregnancy.
- 40 OG12.8.1 Diagnosis and management of isoimmunization in pregnancy. LGT

41 OG12.8.2 Describe the mechanism, prophylaxis, fetal complications of isoimmunization in pregnancy

42 OG12.8.3 Diagnosis and management of isoimmunization in pregnancy SGT

43 OG12.8.4 Discuss Malaria,Thyroid disorders,TORCH in pregnancy LGT

44 OG12.8.4.1 Discuss Malaria,Thyroid disorders,TORCH & STD in pregnancy SGT
TOPIC - LABOUR

11 OG13.1 Enumerate and discuss the physiology of normal labor LGT

12 OG13.1.1 Discuss the physiology of normal labor SGT

13 OG13.1.2 Mechanism of labor in occipito-anterior presentation LGT

14 OG13.1.3 Mechanism of labor in occipito-anterior presentation SGT

15 OG13.1.4 Mechanism of labor in occipito-anterior presentation continuation SGT

16 OG13.1.5 Mechanism of labor in occipito-anterior presentation continuation SGT

17 OG13.1.6 Mechanism of labour in OA Position SDL

18 OG13.1.7 Monitoring of labor including partogram LGT

19 OG13.1.8 Partograph SGT

20 OG13.1.9 Ante natal assessment of fetal well being LGT

21 OG13.1.10 Ante natal assessment of fetal well being SGT

22 OG13.1.11 Conduct of labor, pain relief, management of third stage of labor. LGT

23 OG13.1.12 Conduct of labor , SGT

24 OG13.1.13 Management of third stage of labour SGT

25 OG13.1.14 Conduct of labor and active Management of third stage of labour.

26 OG13.1.15 Principles of induction and acceleration of labor. LGT

27 OG13.1.16 Induction of labour SGT

28 OG13.2 Define, describe the causes, pathophysiology, diagnosis, investigations and management of preterm labor.

29 OG13.2.1 Discuss Preterm labour its pathophysiology, diagnosis SGT

30 OG13.2.2 Tests for assessing fetal lung maturity and role of ante natal steroids.

SGT

31 OG13.2.3 Investigations and management of preterm labor. SGT

32 OG13.2.4 Discuss the management of a Primigravida at 31 weeks of gestation with signs and symptoms of Preterm labour.

33 OG13.2.5 Define, describe the causes, pathophysiology, diagnosis, investigations and management of PROM/PPROM.

34 OG13.2.6 PROM/PPROM SGT

35 OG13.2.7 Define, describe the causes, pathophysiology, diagnosis, investigations and management of Post dated pregnancy.

36 OG13.2.8 Post dated pregnancy SGT

37 OG13.2.8 Feto maternal outcome in Elderly pregnancy,Grand multi, BOH LGT

38 OG13.2.9 Elderly pregnancy,Grand multi, BOH SGT

39 OG14.2 Discuss the mechanism of normal labor, Define and describe obstructed labor, its clinical features; prevention; and management

40 OG14.2.1 Discuss obstructed labor and management. SGT

41 OG14.3 Describe and discuss rupture uterus, causes, diagnosis and

- 42 OG14.3.1 Discuss rupture uterus, causes, diagnosis and management. SGT
- 43 OG14.4 Describe and d Mechanism of labor in occipito-posterior presentation .
- 44 OG14.4.1 Mechanism of labor in occipito-posterior presentation SGT
- 45 OG14.4.2 Deep Transverse Arrest SGT
- 46 OG14.4.3 Discuss Abnormal uterine action SGT
- 47 OG14.4.4 Breech Presentation-causes,diagnosis,fetomaternal outcome and management
- 48 OG14.4.5 Describe and discuss steps of assisted breech delivery and possible complications.
- 49 OG14.4.6 Breech presentation – Mechanism of labour. SGT
- 50 OG14.4.7 Assisted breech delivery steps SGT
- 51 OG14.4.8 Discuss the management of a primigravida at 39weeks of gestation with Breech presentation having severe anemia.
- 52 OG14.4.9 Transverse lie and Brow presentationcauses, diagnosis,fetomaternal outcome and management
- 53 OG14.4.10 Transverse lie and Brow presentation SGT
- 54 OG14.4.11 Compound presentation and cord prolapsed causes,diagnosis,fetomaternal outcome and management
- 55 OG14.4.12 Compound presentation and cord prolapse- SGT
- 56 OG14.4.13 IUFD - causes,diagnosis,complications and management LGT
- 57 OG14.4.14 IUFD SGT
- 58 OG14.4.15 Congenital anomalies of fetus SGT
- 59 OG14.4.16 Discuss the various congenital anomalies of fetus and its prevention.

9 TH TERM :

TOPIC – Operative Obstetrics

61 OG15.1.1 Episiotomy SGT

62 OG15.1.2 Prineal injuries SGT

63 OG15.1.3 Vacuum extraction SGT

64 OG15.1.4 Enumerate and describe the indications and steps of common obstetric procedures, technique and complications:- Low forceps

LGT

65 OG15.1.5 Low forceps SGT

66 OG15.1.6 Discuss the prerequisites, indications, techniques and complications of instrumental delivery.

SDL

67 OG15.1.7 Enumerate and describe the indications and steps of common obstetric procedures, technique and complications:- assisted breech delivery

LGT

68 OG15.1.8 Assisted breech delivery SGT

69 OG15.1.9 Enumerate and describe the indications and steps, technique and complications:-; Caesarean section

LGT

70 OG15.1.10 Caesraean section SGT

71 OG15.1.11 VBAC LGT

72 OG15.1.12 Pregnancy with prior CS SGT

73 OG15.1.13 VBAC SGT

74 OG15.1.14 Enumerate and describe the indications and steps of common obstetric procedures, technique and complications: External cephalic version.

LGT

75 OG15.1.15 External cephalic version SGT

76 OG15.1.16 Enumerate and describe the indications and steps of common obstetric procedures, technique and complications: cervical cerclage

LGT

77 OG15 TOPIC – Complications of the third stage

78 OG16.1 Enumerate and discuss causes, prevention, diagnosis, management, appropriate use of blood and blood products in postpartum haemorrhage.

LGT

79 OG16.1.1 Post partum hemorrhage – Causes and types SGT

80 OG16.1.2 Management of PPH SGT

81 OG16.1.3 Obstetric shock SGT

82 OG16.1.4 ,Appropriate use of blood and blood products in obstertres SGT

83 OG16.1.5 Discuss the management of a patient having atonic PPH. SDL 83

84 OG16.2 Describe and discuss uterine inversion – causes, prevention, diagnosis and management.

LGT 84

85 OG16.2.1 Uterine inversion SGT 85

86 OG16.2.2 Enumerate and discuss causes, prevention, diagnosis,
Management of Retained Placenta.

LGT 86

87 OG16.2.3 Retained Placenta. SGT 87

88 OG16.3 Describe and discuss causes, clinical features, diagnosis,
investigations; monitoring of fetal well-being, including
ultrasound and fetal Doppler; principles of management;
prevention and counselling in intrauterine growth retardation

LGT 88

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89 OG16.3.1 Discuss causes, clinical features, diagnosis of intrauterine growth
retardation.

SGT 89

90 OG16.3.2 Investigations; monitoring of fetal well-being, including
ultrasound and fetal Doppler; principles of management;
prevention and counselling in intrauterine growth retardation.

SGT 90

91 OG16.3.3 USG in Obstetrics SGT

92 OG16.3.4 TIFA Scan SGT

TOPIC - LACTATION

93 OG17.1 Describe and discuss the physiology of lactation LGT

94 OG17.1.1 physiology of lactation SGT

95 OG17.3 Describe and discuss the clinical features, diagnosis and
management of mastitis and breast abscess

LGT

96 OG17.3.1 Clinical features, diagnosis and management of mastitis and breast
abscess

SGT

TOPIC – Care of the newborn

97 OG18.1 Describe and discuss the assessment of maturity of the newborn,
diagnosis of birth asphyxia, principles of resuscitation, common
problems.

LGT

98 OG18.1.1 Assessment of maturity of the newborn diagnosis of birth
asphyxia.

SGT

99 OG18.4 Describe the principles of resuscitation of the newborn and
enumerate the common problems encountered.

LGT

100 OG18.4.1 Common problems encountered in newborns SGT

101 OG18.4.2 Principles of resuscitation of the newborn. SGT

102 OG18.4.3 Discuss the common neonatal problems and steps of neonatal
resuscitation.

TOPIC – Normal and abnormal puerperium

103 OG19.1 Describe and discuss the physiology of puerperium, its complications, diagnosis and management; counselling for contraception, puerperal sterilization

LGT 103

104 OG19.1.1 Physiology of puerperium, its complications, diagnosis and management;

SGT 104

105 OG19.1.2 Puerperal sepsis SGT 105

106 OG19.1.3 Counselling for contraception, puerperal sterilization SGT 106

107 19.1.4 Discuss the normal and abnormal puerperium. SDL 107

TOPIC – Normal and Abnormal Puberty

108 OG23.1 Describe and discuss the physiology of puberty, features of abnormal puberty, common problems and their management

LGT

109 OG23.1.1 the physiology of puberty, features of abnormal puberty

SGT

110 OG23.2 Enumerate the causes of delayed puberty. Describe the Investigation and management of common causes.

LGT

111 OG23.2.1 Causes of delayed puberty its investigation and management. SGT

112 OG23.3 Enumerate the causes of precocious puberty LGT

113 OG23.3.1 Precocious puberty SGT

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TOPIC – Abnormal uterine bleeding

114 OG24.1 Define, classify and discuss abnormal uterine bleeding, its aetiology, clinical features

LGT

115 OG24.1.1 Describe and discuss investigations, diagnosis and Management of AUB.

LGT

116 OG24.1.2 AUB _ Classification and clinical features SGT

117 OG24.1.3 Investigations for AUB SGT

118 OG24.1.4 Medical management of AUB SGT

119 OG24.1.5 Surgical management of AUB SGT

120 OG24.1.6 Discuss the management of a 42year old P2L2 woman having menorrhagic cycles.

SDL

TOPIC – Amenorrhoea

121 OG25.1 Describe and discuss the causes of primary amenorrhea, its investigation and the principles of management.

LGT

122 OG25.1.1 Primary amenorrhea - , its investigation and the principles of management

SGT

123 OG25.1.2 Discuss the possible etiology, investigations and management of a girl of 19 years having primary amenorrhoea.

SDL

124 OG25.1.3 Describe and discuss the causes of Secondary amenorrhea, its investigation and the principles of management.

LGT

125 OG25.1.4 Secondary amenorrhea, its investigation and the principles of management.

SGT

TOPIC - ENDOMETRIOSIS

126 OG26.1 Describe and discuss the etiopathogenesis, clinical features; investigation and implications on health and fertility and management of endometriosis and adenomyosis.

LGT

127 OG26.1.1 Endometriosis - etiology and clinical features. SGT

128 OG26.1.2 Investigations and management of Endometriosis. SGT

129 OG26.1.3 Adenomyosis. SGT

TOPIC - INFERTILITY

130 OG28.1 Describe and discuss the common causes, pathogenesis, clinical features, differential diagnosis; investigations; principles of management of infertility – methods of tubal patency, ovulation induction, assisted reproductive techniques

LGT

131 OG28.1.1 Male infertility SGT

132 OG28.1.2 Female infertility SGT

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133 OG28.2 Enumerate the assessment and restoration of tubal patency. LGT

134 OG28.2.1 Assessment and restoration of tubal patency SGT

135 OG28.2.2 Discuss how to approach a 31 year old woman having primary infertility of 5 years .

SDL

136 OG28.3 Describe the principles of ovulation induction LGT

137 OG28.3.1 Ovulation Induction SGT

138 OG28.3.2 OHSS SGT

139 OG28.4 Enumerate the various Assisted Reproduction Techniques LGT

140 OG28.4.1 Assisted Reproduction Techniques SGT

141 OG28.4.2 Secondary Infertility SGT

TOPIC – UTERINE FIBROID

142 OG29.1 Describe and discuss the etiology; pathology; clinical features; differential diagnosis of fibroid uterus.

LGT

143 OG29.1.1 Etiology; pathology; clinical features; differential diagnosis of fibroid uterus.

SGT

144 OG29.1.2 Describe and discuss investigations; principles of management, complications of fibroid uterus.

LGT

145 OG29.1.3 Investigations; principles of management, complications of fibroid uterus.

SGT

146 OG29.1.4 Fibroids and Infertility SGT

TOPIC – UTERINE FIBROID

147 OG29.1.5 Myomectomy – Indication, steps and complications SGT

TOPIC – PCOS and Hirsutism

148 OG30.1 Describe and discuss the etiopathogenesis; clinical features of PCOS.

LGT

149 OG30.1.1 Describe and discuss the differential diagnosis; investigations; management, complications of PCOS.

LGT

150 OG30.1.2 PCOS - etiopathogenesis; clinical features SGT

151 OG30.1.3 PCOS Management SGT

152 OG30.1.4 Discuss how to approach a 22 year old girl having acne, facial hair and irregular cycles.

SDL 152

153 OG30.2 Enumerate the causes and describe the investigations and management of hyperandrogenism

LGT 153

154 OG30.2.1 Hyperandrogenism SGT 154

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TOPIC – UTERINE PROLAPSE

155 OG31.1 Describe and discuss the etiology, classification, clinical features, diagnosis, investigations prolapse of uterus.

LGT 155

156 OG31.1.1 Principles of management and preventive aspects of prolapse of uterus

LGT 156

157 OG31.1.2 Surgical treatment for prolapsed uterus LGT 157

158 OG31.1.3 Discuss the etiology, classification, clinical features of prolapse of uterus.

SGT

159 OG31.1.4 Discuss the diagnosis, investigations of prolapse of uterus. SGT

160 OG31.1.5 Principles of management and preventive aspects of prolapse of uterus.

SGT

TOPIC – Menopause

161 OG32.1 Describe and discuss the physiology of menopause, symptoms, prevention, management and the role of hormone replacement therapy.

LGT

162 OG32.1.1 Menopause SGT

163 OG32.1.2 Hormone Replacement Therapy SGT

164 OG32.2 Enumerate the causes of postmenopausal bleeding and describe its Management.

LGT

165 OG32.2.1 Post menopausal bleeding SGT

166 OG32.2.1 Dand C & Endometrial aspiration SGT

TOPIC – Benign, Pre malignant(CIN) and Malignant lesions of the Cervix

167 OG33.1 Classify, describe and discuss the etiology, pathology, clinical features, differential diagnosis of Cervical cancer.

LGT

168 OG33.1.1 Discuss investigations and staging of cervical Cancer and its management.

LGT

169 OG33.1.2 Classify, describe and discuss the etiology, pathology, clinical features, differential diagnosis of Cervical cancer.

SGT

170 OG33.1.3 Discuss investigations and staging of cervical Cancer and its management.

SGT

171 OG33.2 Describe the principles of management including surgery and radiotherapy of Benign, Pre-malignant (CIN) Lesions of the Cervix

LGT

172 OG33.2.1 Benign, Pre-malignant (CIN) Lesions of the Cervix SGT
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173 OG33.2.2 principles of management including surgery and radiotherapy of Benign, Pre-malignant (CIN) Lesions of the Cervix

SGT

174 OG33.4 Enumerate the methods to prevent cancer of cervix including visual inspection with acetic acid (VIA), visual inspection of cervix with Lugol's iodine (VILI), pap smear and colposcopy

LGT

175 OG33.4.1 Prevention of Cervical cancer and HPV Vaccine. SGT

176 OG33.4.2 Enumerate the methods to prevent cancer of cervix including visual



inspection with acetic acid (VIA), visual inspection of cervix with Lugol's iodine (VILI), pap smear and colposcopy

SGT

177 OG33.4.3 VILI and VIA SGT

178 OG33.4.4 PAP Smear, Liquid based cytology , SGT

179 OG33.4.5 Colposcopy SGT

TOPIC - Benign and malignant diseases of the uterus and the ovaries

180 OG34.1 Describe and discuss aetiology, pathology, staging clinical features,

differential diagnosis of endometrial cancer.

LGT

181 OG34.1.1 Describe and discuss investigations, staging laparotomy and principles of management of endometrial cancer.

LGT

182 OG34.1.2 Discussion on Endometrial Hyperplasia SGT

183 OG34.1.3 Discussion on Endometrial carcinoma SGT

184 OG34.2 Describe and discuss the etiology, pathology, classification of ovarian tumor.

LGT

185 OG34.2.1 Describe and discuss the etiology, pathology, classification , investigations and management of benign ovarian tumor.

LGT

186 OG34.2.2 Discussion on Benign ovarian tumor SGT

187 OG34.2.3 Describe and discuss the staging clinical features, differential diagnosis of ovarian cancer.

LGT

188 OG34.2.4 Describe and discuss the investigations, principal of management including staging laparotomy of ovarian tumor.

LGT

189 OG34.2.5 Staging laparotomy SGT

190 OG34.2.6 Chemotherapy for Ovarian carcinoma SGT

191 OG34.3.1 Describe and discuss the etiology, pathology, classification, staging,

clinical features, differential diagnosis, investigations and

LGT

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management of gestational trophoblastic disease.

192 OG34.3.2 Discussion on GTN. SGT

193 OG34.3.3 Chemotherapy for GTN.1.17 Cervical incompetence & Cervical cerclage

CLINICAL POSTING - FIRST POSTING :

	OPD	WARD	LR	OT
	OG 35.1 to OG 35.8 History taking (O & G) Clinical examination Routine ANC Protocol for ANC Arriving at a diagnosis Differential diagnosis of a clinical symptoms Identify various tools and instruments require Various STD Vaginal discharge OBSERVE: p/s exam, p/v exam, obtaining of a PAP smear	Obst: Bed side clinic Examination of antenatal mother and case study Observe post natal care Immunization points Encourage breast feeding Puerperal hygiene Maintain asepsis BMW management GYN: History and clinical examination of cases	OG35.6 Ethical behavior with antenatal mother Monitor FHR Examine antenatal mother in different stages of labor Observe : OG35.13 ARM OG13.14 NVD OG13.15 S&E OG13.15.1 PPIUCD insertion OG13.15.2 Epistomy repair Instrumental delivery Assisted breech delivery	Maintain asepsis & BMW management OBSERVE: Pre-op preparation Study case-sheet LSCS Minor surgeries PPIUCD

CLINICAL POSTING – SECOND POSTING :

OPD	WARD	LR	OT
History taking (O & G) Clinical examination Diagnosis and investigations required CASES TO BE STUDIED: Pregnancy with anaemia PTL Postdated GDM Heart disease RH negative RPL BOH HDIP Elderly & grand multi Fibroid PID Ovarian tumour	Obst: Exam and monitoring of AN mothers High risk mother Examination of post-natal & post up cases Maintain asepsis & BMW management. Observe: Wound care Writing discharge & referral. GYN: History and clinical examination of cases	Examine & monitor antenatal mother in different stages of labor Observe : Complicated delivery like breech, shoulder dystocia, PIH, pregnancy with medical disorders. Assist in; NVD, S&E PPIUCD insertion, Epistomy repair, Instrumental delivery, Assisted breech delivery & cervical tear repair. OG35.17 Demonstrate the correct technique of urinary catheterisation in a simulated/ supervised environment	Maintain asepsis & BMW management OBSERVE: LSCS PPIUCD Hysterectomy Laparotomy for ruptured ectopic Surgery for malignancy Maintain records.

CLINICAL POSTING – THIRD POSTING :

OPD	WARD	LR	OT
History taking (O & G) Clinical examination Diagnosis and investigations required & treatment CASES TO BE STUDIED: - Twins - Endometriosis - Prolapse - Infertility - Malignancy Demonstration of USG: dating scan, anomaly scan & FBPP scan. OG36.1 Plan and institute a line of treatment, which is need based, cost effective and appropriate for common conditions taking into consideration (a) Patient (b) Disease (c) Socio-economic status (d) Institution/ Governmental guidelines. <u>PPC</u>: study about all contraceptive, sterilisation	Obst: OG36.2 Organise antenatal, postnatal, well-baby and family welfare clinics Exam and monitoring & study of AN mothers, High risk mother Examination of post up cases Maintain asepsis & BMW management. Assist in wound dressing & suture removal. Postnatal counseling for lactation & contraception. GYN: History and clinical examination of cases Discussion at bed side & plan management.	Examine & monitor antenatal mother in different stages of labor Assist in: NVD, complicated VD S&E, PPIUCD insertion, Episiotomy repair, OG37.6 Instrumental delivery, Assisted breech delivery & cervical tear repair. OBSERVE & ASSIST IN: management of PPH & ectopic pregnancy. Conduct NVD and episiotomy repair OG35.16 Diagnose and provide emergency management of antepartum and postpartum	Maintain asepsis & BMW management ASSIST IN: OG37.1 LSCS PPIUCD OG37.3 Hysterectomy - Encircage - Secondary sutures OG37.4 Laparotomy for ruptured ectopic - Surgery for malignancy Maintain records. OBSERVE OG38.1 Laparoscopy OG38.2 HYSTEROSCOPY OG38.3 LAP STERILISATION OG38.4 Assess the need for and issue proper

REFERENCE BOOKS :

1. DC Dutta Text Book of Obstetrics
- 2.. DC Dutta Text Book of Gynaecology
3. Williams Obstetrics
4. Williams Gynaecology
5. Jeffcoates principles of Gynaecology

6. Ian Donald Obstetrics

7. Shaw's Textbook of gynaecology.



**DEPARTMENT OF
ORTHOPAEDICS
CURRICULUM**

Orthopaedics is branch of modern Medicine which deals with congenital and acquired disorders of Musculo-skeletal system. Considering the advances in the modalities of management for orthopaedic illnesses and increased incidence of trauma, basic preliminary knowledge of Orthopaedics must be acquired at MBBS level.

As an undergraduate trainee, students are expected to know the common orthopaedic illnesses and ailments with respect to their etiopathogenesis, diagnostic clinical features and basic management modalities. They are also expected to learn the principles of bracing, splinting and traction and their application techniques as well as skill to perform the same.

OBJECTIVES: COURSE OUTCOMES

The student at the end of the program should be able to:

1. Explain the principles of recognition of bone injuries and dislocation.
2. Apply suitable methods to detect and manage common infections of bones and joint; learn indications for sequestrectomy, amputations.
3. Identify congenital, skeletal anomalies and their referral for appropriate correction or rehabilitation.
4. Recognize metabolic bone diseases relevant to Indian context.
5. Explain etiopathogenesis, manifestations, and diagnosis of neoplasms affecting bones.
6. Enumerate few recent advances in Orthopaedics.

Skills: At the end of the course, the student shall be able to

7. Detect sprains and deliver first aid measures for common fractures and sprains and manage uncomplicated fractures of clavicle, distal radius, forearm and phalanges.
8. Use techniques of splinting, plaster, and immobilization for fractures.
9. To detect and plan treatment algorithm for common deformities of bone and joint.
10. Advise aspects of rehabilitation for Polio, Cerebral Palsy and Amputation.
11. Apply compression bandage for injuries over extremities.



Introduction to Department



Phase wise teaching program and clinical posting

	Lectures	Seminar, demonstration, integrated teaching	SDL	Clinical posting 3 hours/day
5 th semester	15			6 hours orientation program
7 th semester	15	15	05	
8 th semester	15	20	05	3 Weeks
Total	45 Hours	35 Hours	10 Hours	3 weeks

Course contents and suggested teaching program of Orthopaedics (Total 90 hours)

Lectures, tutorials, seminars, SDL are planned as per the competencies defined in CBME curriculum.

A-Topics for didactic lectures

5th Semester:

Topic: Skeletal trauma, Poly trauma.

1. Introduction and scope of Orthopaedics Traumatology and Orthopaedic Diseases. Idea about Scheme of Examination. Definition and Classification of Fracture and Dislocation, signs, symptoms and diagnosis of sprain, fracture and dislocation. (OR1.3)
2. Aetiopathogenesis, clinical features and management of shock. (OR1.2)
3. First aid measures in Poly-trauma patient, spinal cord Injury patients, principles of triage and knowledge about various splints. (OR1.1)
4. Principles of Management of Fractures, sprain and dislocations with emphasis on various aspects

of closed reduction, immobilization including internal fixation and rehabilitation. (OR1.3)



5. Classification, clinical features, management of compound fractures with emphasis on prevention of infection. (OR2.16)

6. Complications of fracture and its management with specific reference to injury to Muscles, Tendon, nerve and Blood vessels, myositis Ossificans, Sudeck's dystrophy, Volkman's ischaemia, Avascular Necrosis, Fat embolism. (OR2.15)

7. Complications of fracture and its management with specific reference to malunion, Delayed union, Non-union, secondary Osteoarthritis. (OR2.15)

8. Principles of plaster application, technique, plaster complications and plaster disease. (OR13.1) 9.

Fracture Healing in cortical and cancellous bones and factors affecting fracture healing.

Topic: Fractures- Orthopaedic Traumatology

10. Fracture clavicle, scapula, neck 3asciit and shaft 3asciit. (OR2.1) (OR2.2) 11.

Supracondylar fracture 3asciit with complications. (OR2.4)

12. Fracture of Forearm bones, Monteggia and Galeazzi fracture dislocations, fracture 3asciitis head and neck radius. (OR2.5)

13. Fracture scaphoid, Metacarpals and phalanges. (OR2.5)

14. Distal radius fracture, Colles' fracture and Complications. (OR2.6)

15. Dislocation (Acute and Recurrent) of shoulder and elbow. (OR1.5)

7th Semester

16. Fracture of Vertebrae with complications. (OR2.8)

17. Fracture of Pelvis with complications. (OR2.7) Acetabular fracture (OR2.9) 18.

Fracture Neck femur and trochanteric fracture. (OR2.10)

19. Fracture shaft femur and fractures around knee. (OR2.12)

20. Meniscus and ligaments injury at knee. (OR1.3)

21. Fracture Tibia-fibula, fracture in tarsals, Metatarsals and phalanges. (OR2.13) 22.

Fracture dislocation around ankle. (OR2.14)

23. Dislocation of Hip, knee, ankle, tarsals and small bones in foot. (OR2.5) **Topic-**

Musculoskeletal infections

24. Acute Osteomyelitis, Chronic Osteomyelitis. (OR3.1) (OR3.3)

25. Pyogenic arthritis of Hip, knee. (OR3.1) (OR3.2) Fungal Infections and leprosy in Orthopaedics.

(OR3.1)



Topic- Skeletal Tuberculosis

26. Osteo-articular Tuberculosis with special reference to Tuberculosis of Hip, knee and elbow.-
Tuberculosis spine and paraplegia. (OR4.1)

Topic- Inflammatory arthritis

27. Rheumatoid arthritis and other seronegative arthropathies. (OR5.1)

Topic- Degenerative disorders

28. Degenerative disorders of spine- lumbar, cervical disc disorders. (OR6.1) 29.
Degenerative arthritis. Osteoarthritis of knee joint. (OR6.1)
30. Frozen shoulder, Tennis Elbow, Dequervain's disease, Dupuytren's Contracture, Osgood –
Schlatter's disease, Plantar fasciitis. (OR6.1)

8th Semester

Topic- Metabolic bone disorders

31. Metabolic bone disease: Rickets, Osteomalacia and Osteoporosis. (OR7.1) **Topic –**

Poliomyelitis

32. Post Polio Residual Palsy with stress on preventive and rehabilitation aspect. (OR8.1) **Topic-**

Cerebral palsy

33. Cerebral palsy, Diagnosis and rehabilitation. (OR9.1)

Topic- Bone tumours

34. Tumours of bones and its classification. Benign: - Osteochondroma, Giant cell tumour.
Unicameral Bone cyst, Aneurysmal cyst. (OR10.1)
35. Malignant- Osteogenic sarcoma, Ewing's tumour, (OR10.1) Chondrosarcoma 36. Multiple
Myeloma, Secondaries from Primary Carcinoma (Metastatic tumours) (OR10.1)

Topic- Peripheral nerve injuries.

37. Nerve injuries and principles of management. (OR11.1)

Topic: Congenital lesions



38. Congenital skeletal anomalies with emphasis on congenital Talipes Equino varus (CTEV).
Rani Ashoka Medical College
(OR12.1)

- 39. Congenital dislocation of hip (CDH), Osteogenesis Imperfecta (OR12.1)
- 40. Spina Bifida and Torticollis. Osteochondritis – various types. (OR12.1)
- 41. Revision Class
- 42. Revision Class
- 43. Revision Class
- 44. Revision Class
- 45. Revision Class

B- Demonstration Classes, in MBBS in Orthopaedics Once a week class for ONE hours during 8th Semester

Topics of Demonstrations (Total -10, 10 hours)

- 1. Plaster technique and splint applications. (OR13.1)
- 2. Traction application, Orthopaedic appliances demonstration, Demonstration of Physiotherapy equipments. (OR13.1)
- 3. Specimens of sequestrum and Tumours, Madura foot etc.
- 4. Common instruments and Implants.
- 5 to 7. Common X-rays of traumatology, bony infection, joint infection and Tuberculosis, Malunited Colle's fracture, forearm or Supracondylar Humerus fracture.
- 8. Chronic Osteomyelitis case, knee effusion case.
- 9. Non union of fracture.
- 10. Bone tumour

C- Seminar in 8th & 9th semester (Total -5, Total 2 hours)

- 1. Osteomyelitis.
- 2. Tuberculosis.
- 3. Bone tumours.
- 4. First aid and acute trauma Lifesaving measures.

D- Fractures around proximal femur.

1. Supracondylar fracture Humerus.
2. Colle"s fracture.
3. Fracture neck femur.
4. Spine examination, Pott's spine and paraplegia
5. CTEV.
6. Shoulder, Elbow and wrist examination.
7. Hip examination.
8. Knee, ankle foot examination.
9. Nerve examination and nerve injuries.
10. Amputation and Disarticulation – Indications methods and complications.

F- Self directed learning sessions in 8th & 9th semester - 10 hours

Total 10 sessions of 1 hour each

SDL sessions, Case based learning, Problem based learning, Group discussion.

G- Integrated teaching- 1 hour each in 8th & 9th semester - 10 hours

	Topic	Department	Phase
1.	Bone infections	Anatomy, Microbiology, Pathology, Radiology	8 th semester
2.	Joint infections	Anatomy, Microbiology, Pathology, Radiology	8 th semester
3.	Mechanical injuries and wounds certification medico legal aspects.	Forensic medicine	8 th semester
4.	Skeletal tuberculosis	Microbiology, Pathology, Radiology,	8 th semester

		Pharmacology	
5.	Bone tumours	Anatomy Pathology, Radiology	8 th semester
6.	Basic life support	Surgery, Anaesthesia.	8 th semester
7.	Metabolic disorders	Anatomy, Pathology, Radiology	9 th Semester

8.	Inflammatory arthritis	Pathology, Medicine, Pharmacology	9 th Semester
9.	Rehabilitation in Orthopaedics	PMR	9 th Semester
10.	Cerebral palsy and PPRP	PMR	9 th Semester

Topics to learn in clinical postings (Including Clinical Clerkship)- 3 weeks in 8th semester

1. Bedside history taking in ward.
2. Observing procedures in Operation theatre and casualty. (OR13.2)
3. Examine indoor (medical; preoperative and postoperative) patients.
4. Learn examination, principles of treatment and techniques of traction, wound care and splintage. (OR13.1)
5. Attend OPD, operation theatre and emergency operations for acclimatization. (OR13.1)
6. Attending ward rounds.
7. Learn plaster application, post plaster care. (OR13.1)
8. Learn to explain prognosis of fractures/ diseases to patients posted for surgery, breaking bad news. (OR14.1)
9. Participate in the teaching sessions in ward for bedside clinical examination.
10. Learn about common x-ray findings, common orthotics and prosthetics.

11. Attend subspecialty clinics- arthritis, spine disorder, sports medicine clinics.



*12. Learn common pathological specimen, instruments in Orthopaedics.

13. Learn how to take written informed consent for Orthopaedics procedures.

14. Learn to counsel patients for amputations and explaining care of amputation stump. (OR13.2). 15.

Learn referral of patients to other departments based on warning signs. (OR14.3)

CERTIFIABLE PROCEDURAL SKILLS

The undergraduate learns:

1. Application of basic splints and slings (I)
2. Basic fracture and dislocation management (O)
3. Compression bandage (I)

Assessment plan

Formative assessment- Internal assessment:

Internal assessment examinations will be conducted at the end of 6th, 8th Semester and 9th Semester.

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	Theory	Timing	Practical at the end of semester
IA 1	15Marks (Five SAQ of 3 marks each)	End of 6 th semester	-
IA 2	15 Marks (Five SAQ of 3 marks each)	End of 8 th semester clinical posting	20 Marks(Short case, Table Viva) (To be converted out of 10)
Prelims	20 Marks in Surgery Paper II- Section A- Part 2 (Que.- 3- One Structured Long Answer Question of 10 marks Que. 4-Five Short Answer Questions of 2 marks each)	End of 9 th semester	25 Marks (1 Short case of 15 Marks + Viva Voce 10 marks)

***Prelim examination will be conducted in accordance with the pattern of the final examination for practical.**

Summative assessment at the end of 9th semester

Final professional examination will be conducted along with General Surgery paper

· Theory examination- Total Marks 20 in Surgery Paper II- Section A- Part 2 ➤ Que.-

3- One Structured Long Answer Question of 10 marks

➤ Que. 4- Five Short Answer Questions of 2 marks each



Practical examination- Will be conducted along with Surgery dept.

➤ Total Marks- 25 (1 Short case 15 Marks + Viva Voce 10 Marks)

Recommended books for reading

1. Outlines of Fractures, Adams, Crawford Churchill Livingstone.
2. Apley's Systems of Orthopaedics and fracture, Louis Solomon, Hodder Arnold. 3.
- Essentials of Orthopaedics, J Maheshwari, Jaypee Publications.
4. Clinical Orthopaedic Examination, Ronald Mcrae, Churchill Livingstone Elsevier.

Reference books

1. Campbell's Operative Orthopaedics, Elsevier.
2. Rockwood and Green's Fractures in Adults, Lippincott Williams and Wilkins. 3.
- Tachdjian's Pediatric Orthopaedics, Saunders/ Elsevier.

SYLLABUS

Competencies in Orthopaedics				
No.	Topic	Competencies	Core	Non-Core
1	Skeletal Trauma, Poly trauma	06		

2	Fractures	16		
3	Musculoskeletal Infection	03		
4	Skeletal Tuberculosis	01		
5	Rheumatoid Arthritis and associated inflammatory disorders	01		
6	Degenerative disorders	01		
7	Metabolic bone disorders	01		
8	Poliomyelitis	01		
9	Cerebral Palsy	01		
10	Bone Tumours	01		
11	Peripheral nerve injuries	01		
12	Congenital lesions	01		
13	Procedural Skills	02		
14	Counselling Skills	03		

TOTAL	34		



Topic 1

Skeletal Trauma, Poly trauma

Sl. No.	Competency number	Competency
1	OR1.1	Describe and discuss the Principles of pre-hospital care and Casualty management of a trauma victim including principles of Triage

2	OR1.2	Describe and discuss the aetiopathogenesis, clinical features, investigations, and principles of management of shock
3	OR1.3	Describe and discuss the aetiopathogenesis, clinical features, investigations, and principles of management of soft tissue injuries
4	OR1.4	Describe and discuss the Principles of management of soft tissue injuries
5	OR1.5	Describe and discuss the aetiopathogenesis, clinical features, investigations, and principles of management of dislocation of major joints, shoulder, knee, hip
6	OR1.6	Participate as a member in the team for closed reduction of shoulder dislocation / hip dislocation / knee dislocation

Topic 2

Fractures

Sl. No.	Competency number	Competency
1	OR2.1	Describe and discuss the mechanism of Injury, clinical features, investigations and plan management of fracture of clavicle

2	OR2.2	Describe and discuss the mechanism of Injury, clinical features, investigations and plan management of fractures of proximal Humerus
3	OR2.3	Select, prescribe and communicate appropriate medications for relief of joint pain
4	OR2.4	Describe and discuss the mechanism of injury, clinical features, investigations and principles of management of fracture of shaft of humerus and intercondylar fracture humerus with emphasis on neurovascular deficit
5	OR2.5	Describe and discuss the aetiopathogenesis, clinical features, mechanism of injury, investigation & principles of management of fractures of both bones forearm and Galeazzi and Monteggia injury
6	OR2.6	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of fractures of distal radius
7	OR2.7	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of pelvic injuries with emphasis on hemodynamic instability
8	OR2.8	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of spine injuries with emphasis on mobilisation of the patient

9	OR2.9	Describe and discuss the mechanism of injury, Clinical features, investigations and principle of management of acetabular fracture
10	OR2.10	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of fractures of proximal femur
11	OR2.11	Describe and discuss the aetiopathogenesis, mechanism of injury, clinical features, investigations and principles of management of (a) Fracture patella (b) Fracture distal femur (c) Fracture proximal tibia with special focus on neurovascular injury and compartment syndrome
12	OR2.12	Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of Fracture shaft of femur in all age groups and the recognition and management of fat embolism as a complication
13	OR2.13	Describe and discuss the aetiopathogenesis, clinical features, Investigation and principles of management of: a) Fracture both bones leg (b) Calcaneus (c) Small bones of foot
14	OR2.14	Describe and discuss the aetiopathogenesis, clinical features, Investigation and principles of management of ankle fractures

15	OR2.15	Plan and interpret the investigations to diagnose complications of fractures like malunion, non-union, infection, compartmental syndrome
16	OR2.16	Describe and discuss the mechanism of injury, clinical features, investigations and principles of management of open fractures with focus on secondary infection prevention and management

TOPIC 3

Musculoskeletal Infection

Sl. No.	Competency number	Competency
1	OR3.1	Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of Bone and Joint infections a) Acute Osteomyelitis b) Subacute osteomyelitis c) Acute Suppurative arthritis d) Septic arthritis & HIV infection e) Spirochaetal infection f) Skeletal Tuberculosis



2	OR3.2	Participate as a member in team for aspiration of joints under supervision
3	OR3.3	Participate as a member in team for procedures like drainage of abscess, sequestrectomy/ saucerisation and arthrotomy

TOPIC 4

Skeletal Tuberculosis

Sl. No.	Competency number	Competency
1	OR4.1	Describe and discuss the clinical features, Investigation and principles of management of Tuberculosis affecting major joints (Hip, Knee) including cold abscess and caries spine

TOPIC 5

Rheumatoid Arthritis and associated inflammatory disorders

Sl. No.	Competency number	Competency
1	OR5.1	Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of various inflammatory disorder of joints

TOPIC 6

Degenerative disorders



Sl. No.	Competency number	Competency
1	OR6.1	Describe and discuss the clinical features, investigations and principles of management of degenerative condition of spine Cervical Spondylosis, Lumbar Spondylosis, PID

TOPIC 7

Metabolic bone disorder

Sl. No.	Competency number	Competency
1	OR 7.1	Describe and discuss the aetiopathogenesis, clinical features, investigation and principles of management of metabolic bone disorders in particular osteoporosis, osteomalacia, rickets, Paget's disease.

Topic 8: Poliomyelitis

Sl. No.	Competency number	Competency
1	OR 8.1	Describe and discuss the aetiopathogenesis, clinical features, assessment and principles of management a patient with Post Polio residual paralysis

Sl. No.	Competency number	Competency
1	OR9.1	Describe and discuss the aetiopathogenesis, clinical features, assessment and principles of management of Cerebral palsy patient

Topic 10:
Bone Tumours

Sl. No.	Competency number	Competency
1	OR10.1	Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of benign and malignant bone tumours and pathological fractures

Topic 11:
Peripheral nerve injuries

Sl. No.	Competency number	Competency
1	OR11.1	Describe and discuss the aetiopathogenesis, clinical features, investigations and principles of management of peripheral nerve injuries in diseases like foot drop, wrist drop, claw hand, palsies of Radial, Ulnar, Median, Lateral Popliteal and Sciatic Nerves

Topic 12:
Congenital lesions:

Sl. No.	Competency number	Competency
1	OR12.1	Describe and discuss the clinical features, investigations and principles of management of Congenital and acquired malformations and deformities of: a. limbs and spine - Scoliosis and spinal bifida b. Congenital dislocation of Hip, Torticollis, c. congenital talipes equino varus

Topic 13:
Procedure skills

Sl. No.	Competency number	Competency
1	OR13.1	Participate in a team for procedures in patients and demonstrating the ability to perform on mannequins / simulated patients in the following: i. Above elbow plaster ii. Below knee plaster iii. Above knee plaster iv. Thomas splint v. splinting for long bone fractures vi. Strapping for shoulder and clavicle trauma
2	OR13.2	Participate as a member in team for Resuscitation of Polytrauma victim by doing all of the following : (a) I.V. access central - peripheral (b) Bladder catheterization (c) Endotracheal intubation (d) Splintage

Topic 14:
Counselling Skills

Sl. No.	Competency number	Competency
1	OR14.1	Demonstrate the ability to counsel patients regarding prognosis in patients with various orthopedic illnesses like a. fractures with disabilities b. fractures that require prolonged bed stay c. bone tumours d. congenital disabilities.
2	OR14.2	Demonstrate the ability to counsel patients to obtain consent for various orthopedic procedures like limb amputation, permanent fixations etc.....

 3	OR14.3	Demonstrate the ability to convince the patient for referral to a higher centre in various orthopedic illnesses, based on the detection of warning signals and need for sophisticated management

Integration Topics

Human Anatomy

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	AN2.4	Describe various types of cartilage with its structure & distribution in body	Orthopaedics	
2	AN2.5	Describe various joints with subtypes and examples	Orthopaedics	
3	AN8.4	Demonstrate important muscle attachment on the given bone	Orthopaedics	
4	AN8.6	Describe scaphoid fracture and explain the anatomical basis of avascular necrosis	Orthopaedics	

5	AN10.12	Describe and demonstrate Shoulder joint for– type, articular surfaces, capsule, synovial membrane, ligaments, relations, movements, muscles involved, blood supply, nerve supply and applied anatomy	Orthopaedics	
6	AN11.4	Describe the anatomical basis of Saturday night paralysis	Orthopaedics	
7	AN17.2	Describe anatomical basis of complications of fracture neck of femur.	Orthopaedics	
8	AN17.3	Describe dislocation of hip joint and surgical hip replacement	Orthopaedics	
9	AN18.6	Describe knee joint injuries with its applied anatomy	Orthopaedics	
10	AN18.7	Explain anatomical basis of Osteoarthritis	Orthopaedics	
11	AN19.4	Explain the anatomical basis of rupture of calcaneal tendon	Orthopaedics	
12	AN19.6	Explain the anatomical basis of Flat foot & Club foot	Orthopaedics	
13	AN19.7	Explain the anatomical basis of Metatarsalgia & Plantar fasciitis	Orthopaedics	

14	AN50.4	Explain the anatomical basis of Scoliosis, Lordosis, Prolapsed disc, Spondylolisthesis & Spina bifida	Orthopaedics	

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Pathology

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	PA33.1	Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications of osteomyelitis	Orthopaedics Human Anatomy	Microbiology

2	PA33.2	Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications and metastases of bone tumors	Orthopaedics	
3	PA33.3	Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications and metastases of soft tissue tumors	Orthopaedics	
4	PA33.4	Classify and describe the etiology, pathogenesis, manifestations, radiologic and morphologic features and complications of Paget's disease of the bone	Orthopaedics	

Microbiology

1	MI4.2	Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of bone & joint infections.	Orthopaedics	



FORENSIC MEDICINE & TOXICOLOGY

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	FM3.7	Describe factors influencing infliction of injuries and healing, examination and certification of wounds and wound as a cause of death: Primary and Secondary	Forensic medicine Orthopaedics	
2	FM3.8	Mechanical injuries and wounds: Describe and discuss different types of weapons including dangerous weapons and their examination.	General Surgery Orthopaedics	

3	FM3.9	Firearm injuries: Describe different types of firearms including structure and components. Along with description of ammunition propellant charge and mechanism of fire-arms, different types of cartridges and bullets and various terminology in relation of firearm – caliber, range, choking.	General Surgery Orthopaedics	
4	FM3.10	Firearm injuries: Describe and discuss wound ballistics- different types of firearm injuries, blast injuries and their interpretation, preservation and dispatch of trace evidences in cases of firearm and blast injuries, various tests related to confirmation of use of firearms	General Surgery Orthopaedics	
5	FM3.11	Regional Injuries: Describe and discuss regional injuries to head (Scalp wounds, fracture skull, intracranial haemorrhages, coup and contrecoup injuries), neck, chest, abdomen, limbs, genital organs, spinal cord and skeleton	General Surgery Orthopaedics	
6	FM3.12	Regional Injuries Describe and discuss injuries related to fall from height and vehicular injuries – Primary and Secondary impact, Secondary injuries, crush syndrome, railway spine.	General Surgery Orthopaedics	

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration
1	IM7.5	Develop a systematic clinical approach to joint pain based on the pathophysiology		Orthopaedics
2	IM7.6	Describe and discriminate acute, subacute and chronic causes of joint pain		Orthopaedics
3	IM7.7	Discriminate, describe and discuss arthralgia from arthritis and mechanical from inflammatory causes of joint pain		Orthopaedics
4	IM7.8	Discriminate, describe and discuss distinguishing articular from periarticular complaints		Orthopaedics
5	IM7.9	Determine the potential causes of joint pain based on the presenting features of joint involvement		Orthopaedics
6	IM7.10	Describe the common signs and symptoms of articular and periarticular diseases		Orthopaedics
7	IM7.13	Perform a systematic examination of all joints, muscle and skin that will establish the diagnosis and severity of disease		Orthopaedics
8	IM7.17	Enumerate the indications for arthrocentesis		Orthopaedics
9	IM7.18	Enumerate the indications and interpret plain radiographs of joints	Radiodiagnosis	Orthopaedics

10	IM7.21	Select, prescribe and communicate appropriate medications for relief of joint pain	Pharmacology	Orthopaedics
11	IM24.12	Describe and discuss the aetiopathogenesis, clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of degenerative joint disease		Orthopaedics
12	IM24.13	Describe and discuss the aetiopathogenesis, clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of falls in the elderly		Orthopaedics, Physical Medicine and Rehabilitation
13	IM24.14	Describe and discuss the aetiopathogenesis, clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of common fractures in the elderly		Orthopaedics
14	IM24.16	Describe and discuss the principles of physical and social rehabilitation, functional assessment, role of physiotherapy and occupational therapy in the management of disability in the elderly		Orthopaedics, Physical Medicine and Rehabilitation

Physical Medicine And Rehabilitation

Sl. No.	Competency number	Competency	Vertical Integration	Horizontal Integration

1	PM1.2	Define and describe disability, its cause, and magnitude, identification and prevention of disability		Orthopaedics and General Medicine
2	PM1.3	Define and describe the methods to identify and prevent disability		Orthopaedics and General Medicine
3	PM1.4	Enumerate the rights and entitlements of differently abled persons		Orthopaedics and General Medicine
4	PM4.1	Describe the common patterns, clinical features, investigations, diagnosis and treatment of common causes of arthritis		Orthopaedics and General Medicine
5	PM4.3	Observe in a mannequin or equivalent the administration of an intra- articular injection		Orthopaedics
6	PM4.5	Demonstrate correct assessment of muscle strength and range of motion		Orthopaedics and General Medicine
7	PM5.1	Enumerate the indications and describe the principles of amputation		Orthopaedics and General Surgery
8	PM5.2	Describe the principles of early mobilization, evaluation of the residual limb, contralateral limb and the influence of co-morbidities		Orthopaedics
9	PM5.3	Demonstrate the correct use of crutches in ambulation and postures to correct contractures and deformities		Orthopaedics

10	PM5.4	Identify the correct prosthesis for common amputations		Orthopaedics
11	PM6.3	Describe the principles of skin traction, serial casts and surgical treatment including contracture release, tendon transfer, osteotomies and arthrodesis.		Orthopaedics

12	PM6.4	Describe the principles of orthosis for ambulation in PPRP.		Orthopaedics
13	PM7.1	Describe and discuss the clinical features, diagnostic work up, work up diagnosis and management of spinal cord injury		Orthopaedics
14	PM7.2	Describe and demonstrate process of transfer, applications of collar restraints while maintaining airway and prevention of secondary injury in a mannequin/model.		Orthopaedics
15	PM7.3	Perform and demonstrate a correct neurological examination in a patient with spinal injury and determine the neurologic level of injury		Orthopaedics
16	PM7.4	Assess bowel and bladder function and identify common patterns of bladder dysfunction.		General Medicine, Orthopedics
17	PM7.5	Enumerate the indications and identify the common mobility aids and appliances, wheel chairs		Orthopaedics

18	PM7.7	Enumerate and describe common life threatening complications following SCI like Deep vein Thrombosis, Aspiration Pneumonia, Autonomic dysreflexia		General Medicine, Orthopedics
19	PM8.1	Describe the clinical features, evaluation, diagnosis and management of disability following traumatic brain injury		General Medicine, Orthopedics and General Surgery

Internship – ORTHOPAEDICS

1 month of internship in Orthopaedics' (Including PMR) after passing final professional examination. **Goals**

of internship in Orthopaedics

The aim of teaching the undergraduate student in Orthopaedics and Physical Medicine and



Rehabilitation is to impart such knowledge and skills that may enable him to diagnose and treat common musculoskeletal ailments. He/she shall have ability to diagnose and suspect presence of fractures, dislocations, acute osteomyelitis, acute poliomyelitis and common congenital deformities such as congenital talipes equino varus (CTEV) and developmental dysplasia of hip (DDH).

(A) THERAPEUTIC- An intern must assist in:

- a) Splinting (plaster slab) for the purpose of emergency splintage, definitive splintage and postoperative splintage and application of Thomas splint,
- b) Manual reduction of common fractures – phalangeal, metacarpal, metatarsal and Colles’ fracture, c) Manual reduction of common dislocations – interphalangeal, metacarpophalangeal, elbow and shoulder dislocations,
- d) Plaster cast application for undisplaced fractures of arm, fore arm, leg and ankle, e) Emergency care of a multiple injury patient,
- f) Transport and bed care of spinal cord injury patients.

(B) Skill that an intern should be able to perform under supervision:

- a) Advise about prognosis of poliomyelitis, cerebral palsy, CTEV and CDH,
- b) Advise about rehabilitation of amputees and mutilating traumatic and leprosy deformities of hand.

(C) An intern must have observed or preferably assisted the following operations: a)

- Drainage for acute Osteomyelitis,
- b) Sequestrectomy in chronic Osteomyelitis,
- c) Application of external fixation,
- d) Internal fixation of fractures of long bones.

The student will record all the activities during the internship posting in a Log Book and competencies will be certified using appropriate evaluation methods.



Curriculum for Ophthalmology 2022



**Ramaiah Medical College
Ramaiah University of Applied Sciences
Bengaluru-560054**



Ramaiah University of Applied **Sciences -Ophthalmology** **Curriculum as per the** **newCompetency Based Medical** **Education**

Preamble

The NMC envisages that the Indian Medical Graduate, should function as the Physician of first contact in the community, to provide holistic health care to the evolving needs of the nation and the world. To fulfill this the IMG should be able to perform the following roles: a clinician, a communicator, a lifelong learner, a professional and a team leader.

Competency-based medical education (CBME) is an outcomes-based training model that has become the new standard of medical education internationally. This new curriculum is being implemented across the country and the first batch has been enrolled since the academic year 2019. The regulatory and accrediting body NMC had started the process by training faculty across the country in the key principles of CBME and developing key competencies for each speciality with the input from expert groups under each speciality.

Introduction to the Department

Ophthalmology is one of the most advanced specialities in the field of medicine. Ophthalmology deals with preserving vision, the most important special sense. The eye is a unique organ, with none other to match it in structure, function, and gross appearance. Most disorders of the eye lend itself to direct visualization. The advances in ophthalmology are frequent both in diagnostics and treatment options. It is an interesting area of study. The Ophthalmology undergraduate curriculum provides the IMG the requisite knowledge, essential skills, and appropriate attitudes to be able to diagnose and treat common ocular disorders and to be able to recognize serious eye conditions and refer appropriately.

The NMC, in the Graduate medical regulations 2019, has provided the list of ophthalmology competencies required for an IMG and these have been included in this ophthalmology curriculum document. The Specific learning objectives (SLO's) to achieve each competency has been listed along with the suggested Teaching-Learning methods and preferred assessment methods both formative and summative.

Following this is a detailed blueprint showing the weightage and the assessment tool for a particular chapter. This blueprint will ensure that there is an alignment between the SLOs', TL methods and the assessment.

Goals and Objectives of the RUAS Ophthalmology Curriculum

Goals

The broad goal of the ophthalmology curriculum is to equip the IMG with sufficient knowledge, skills and attitude to diagnose and appropriately treat common ophthalmic disorders affecting our population.

Objectives

A) Knowledge

At the end of the course student should be able to:

- Describe the applied anatomy, physiology and biochemical attributes of the normal eye and adnexa.
- Describe the pathophysiology, clinical features, and management of diseases of the eye, orbit and adnexa.
- Demonstrate the ability to apply the knowledge in a clinical setting.
- Know about National programme for control of blindness, Vision 2020.

(B) Skills

At the end of the course the student should be able to:

- Elicit a detailed clinical history and perform an ocular examination in both outpatient and ward setting.
- Apply the elicited history and examination to arrive at correct diagnosis and plan treatment.
- Perform minor diagnostic and therapeutic procedures in an emergency situation prior to referral to higher centres

c) Attitude and communication skills

At the end of the course the student should be able to:

- Communicate effectively with patients, their families and the public at large.
- Communicate effectively with peers and teachers demonstrate the ability to work effectively with peers in a team.
- Demonstrate professional attributes of punctuality, accountability and respect for teachers and peers.
- Appreciate the issues of equity and social accountability while undergoing all clinical encounters

Course content

The course content been given in detail in the Table, which includes competencies, specific learning objectives for each competency and the suggested Teaching-Learning methods and assessment methods both formative and summative. The competencies have been developed by an expert group nominated by NMC, while the SLOs, T-L methods and assessments methods have written by the expert committee.

Teaching-Learning methods and Time allotted

	Lectures	Small group discussion	Self-directed learning	Total hours	Clinical postings
Ophthalmology	30hours	60hours	10hours	100 hours	Two postings of 4 weeks each. First posting in 3-4 th terms (15hours/week) and Second posting in 6-7 th terms (18hours/week)

Teaching-learning methods shall be learner centric and shall predominantly include small group learning, interactive teaching methods and case-based learning. Didactic lectures not to exceed one-third of the total teaching time. The teaching learning activity focus should be on application of knowledge rather than acquisition of knowledge.

The curricular contents shall be vertically and horizontally aligned and integrated to the maximum extent possible to enhance learner's interest and eliminate redundancy and overlap. The integration allows the student to understand the structural basis of ophthalmologic problems, their management and correlation with function, rehabilitation, and quality of life. Acquisition and certification of skills shall be through experiences in patient care, diagnostic and skill laboratories. Use of skill lab to train undergraduates in Direct Ophthalmoscopy although not mandatory, but it is desirable.



The clinical postings in the second professional shall be 15 hours per week (3 hrs per day from Monday to Friday)

The clinical postings in the third professional part II shall be 18 hours per week (3 hrs per day from Monday to Saturday)

Newer T-L method like Learner-doctor method (Clinical clerkship) should be mandatorily implemented, from 1st clinical postings in ophthalmology itself.

The goal of this type of T-L activity is to provide learners with experience in longitudinal patient care, being part of the health care team, and participate in hands-on care of patients in outpatient and inpatient setting. During the 1st clinical postings, the students are oriented to the working of the department. During the second clinical posting the students are allotted patients, whom they follow-up through their stay in the hospital, participating in that patient's care including case work-up, following-up on investigations, presenting patient findings on rounds, observing surgeries if any till patient is discharged.

The development of ethical values and overall professional growth as integral part of curriculum shall be emphasized through a structured longitudinal and dedicated programme on professional development including attitude, ethics, and communication which is called the AETCOM module. The purpose is to help the students apply principles of bioethics, systems-based care, apply empathy and other human values in patient care, communicate effectively with patients and relatives and to become a professional who exhibits all these values. This will be a longitudinal programme spread across the continuum of the MBBS programme including internship. MBBS Phase 3 Part 1, has to complete 5 modules of 5 hours each. The Ophthalmology faculty will have the responsibility of conducting 1-2 modules as per the decision and logistics of each institution.

List of all Ophthalmology Competencies with their specific learning objectives, with suggested teaching- learning and assessment methods

	Competencies	Specific learning objectives	Teaching learning methods	When T-L will be done	Formative assessment	Summative assessment
Topic: Refractive errors						
OP1.1	Describe the physiology of vision	Anatomy of retina and fovea Visual pathway Mechanism of vision Theories of color vision	Lecture	6 th term	MCQs at the end of lecture	Short essay/viva voce



OP1.2	Define, classify and describe the types and methods of correcting refractive errors.	Definition of myopia, hypermetropia and astigmatism Describe the Types of myopia Describe Types of hypermetropia Describe Types of astigmatism Enumerate the Treatment options for myopia Enumerate the retinal findings in myopia Enumerate the Treatment options of hypermetropia Describe the treatment of astigmatism List the indications and advantages, complications of contact lenses	Lectures Tutorial to reinforce learning and prevent decay	6 th term	MCQs/SAQ's at the end of lecture or a group of lectures	Essay/SAQ/viva voce
OP1.3	Demonstrate the steps in performing	Assess visual acuity using Snellen's chart	DOAP session	1 st posting	Skill assessment	End of 1st posting – OSCE

	the visual acuity assessment for distance vision, near vision, colour vision, the pin hole test and the menace and blink reflexes	Demonstrate use of pin hole in visual acuity testing and interpret the findings Assess near vision using Times new Roman charts Elicit the blink reflex and menace reflex in an adult patient Assess color vision using Ishihara's color plates	during clinical posting		during clinics Logbook	or short case
OP1.4	Enumerate the indications and describe the principles of refractive surgery	Enumerate the types of refractive surgery Enumerate the indication for refractive surgery Briefly describe the principle of LASIK	Lecture	6 th term	MCQ's/SAQ/ Viva voce at the end of lecture	Short essay/viva voce
OP1.5	Define, enumerate the types and the mechanism by which strabismus leads to amblyopia	Define amblyopia Enumerate the types of amblyopia Describe briefly the mechanism of strabismic amblyopia	Lecture	6 th term	MCQ's/SAQ/ Viva voce at the end of lecture	Short essay/viva voce
Topic: Lids and Adnexa, Orbit Number of Competencies: (08)						
OP2.1	Enumerate the causes, describe and discuss the aetiology, clinical presentations and diagnostic features of common conditions of the lid	Describe the etiology, clinical features of common conditions of the lid and adnexa including Hordeolum externum/ internum, blepharitis, preseptal cellulitis, dacryocystitis, hemangioma, dermoid, ptosis, entropion, lid lag, lagophthalmos	Lecture, Small group discussion like tutorials, PBL or CBL	6 th term	MCQs/SAQ/ Viva voce	Short essay/viva voce

	and adnexa					
OP2.2	Demonstrate the symptoms & clinical signs of conditions enumerated in OP2.1	Elicit signs and symptoms of common eyelid conditions Diagnose accurately common lid conditions based on the elicited signs and symptoms Accurately prescribe the local medication for common lid conditions Counsel a patient with lagophthalmos the need for tarsorrhaphy	DOAP session during clinical posting	1st clinical posting	Skill Assessment during clinics Logbook	End of 1st posting – OSCE or short case
OP2.3	Demonstrate under supervision clinical procedures performed in the lid including: bells phenomenon, assessment of entropion/ectropion, perform the regurgitation test of lacrimal sac. Massage technique in cong. dacryocystitis, and trichiasis cilia removal by epilation	Elicit Bell's phenomenon perform lacrimal sac regurgitation test Demonstrate the correct technique of lacrimal sac massage for congenital nasolacrimal duct obstruction to the mother	DOAP session during clinical posting	1st clinical posting	Skill Assessment during clinics Logbook	End of 1st posting – OSCE or short case
OP2.4	Describe the aetiology, clinical presentation.	Discuss the etiopathogenesis of orbital cellulitis Describe the clinical features of OC	Lecture, Small group discussion	7th term	MCQs/ SAQ/ Viva voce	Short essay/viva voce

	Discuss the complications and management of orbital cellulitis	Discuss the management of OC				
OP2.5	Describe the clinical features on ocular examination and management of a patient with cavernous sinus thrombosis	Enumerate the predisposing factors for cavernous sinus thrombosis Compare and contrast clinical features of OC and cavernous sinus thrombosis Describe the management of CST	Lecture	7th term	MCQs/SAQ/ Viva voce	Short essay/viva voce
OP2.6	Enumerate the causes and describe the differentiating features, and clinical features and management of proptosis	Discuss causes of unilateral proptosis Enumerate the causes of bilateral proptosis	Lecture, SGD	7th term	MCQs/ SAQ/ Viva voce	Short essay/viva voce
OP2.7	Classify the various types of orbital tumours. Differentiate the symptoms and signs of the presentation of various types of ocular tumours		Lecture, SGD	7 th term	Written/ Viva voce	Short essay/viva voce
OP2.8	List the investigations helpful in diagnosis of orbital		Lecture, SGD	7th term	Written/ Viva voce	Short essay/viva voce



Enumerate
the indications for
appropriate referral

Topic: Conjunctiva Number of Competencies (09)

OP3.1	Elicit document and present an appropriate history in a patient presenting with a “red eye” including congestion, discharge, pain	Elicit appropriate history in a patient presenting with "Red eye" Perform ocular examination including vision assessment, pupil examination in a patient with "red eye" Counsel a patient with conjunctivitis on appropriate hand hygiene to prevent spread of infection	DOAP session during clinical posting Logbook	1st clinical posting	Skill assessment Logbook	End of 1st posting – OSCE or short case
OP3.2	Demonstrate document and present the correct method of examination of a “redeye” including vision assessment, corneal lustre, pupil abnormality, ciliary tenderness	Demonstrate correct method of digital tonometry Discuss the differential diagnosis of "red eye"	DOAP session	1st clinical posting	Skill assessment Logbook	End of 1st posting – OSCE or short case
OP3.3	Describe the aetiology, pathophysiology, ocular features, differential diagnosis, complications. and	Describe the clinical features of ophthalmia neonatorum according to the pathogenetic agent Describe the management of Ophthalmia neonatorum Compare the clinical features of	Lecture	6th term	SAQ Viva voce	Essay/SAQ



	Management of various causes of conjunctivitis	conjunctivitis of different aetiologies Describe the management of bacterial conjunctivitis				
OP3.4	Describe the aetiology, pathophysiology, ocular features, differential diagnosis, complications, and management of trachoma.	Describe the clinical features of Trachoma Describe the management of Trachoma Describe the WHO classification of Trachoma Discuss the National programme for control of blindness due to Trachoma	Lecture	6th term	MCQs/SAQ/ Viva voce	Essay/SAQ
OP3.5	Describe the aetiology, pathophysiology, ocular features, differential diagnosis, complications and management of vernal catarrh	Describe the clinical features of vernal catarrh How will you manage a patient with vernal catarrh	Lecture,	6th term	Written/ Viva voce	Essay/SAQ
OP3.6	Describe the aetiology, pathophysiology, ocular features, differential diagnosis, complications and management of pterygium	Elicit appropriate history and clinical signs of pterygium Enumerate causes of decreased vision due to pterygium Describe the different surgical options for pterygium	Lecture	6th term	Skill assessment SAQs	Essay/SAQ
OP3.7	Describe the aetiology,	Enumerate causes and complications of symblepharon	Lecture	6th term	MCQs/SAQ/ Viva voce	SAQ



	pathology, ocular features, differential diagnosis, complications and management of symblepharon					
OP3.8	Demonstrate correct technique of removal of foreign body from the eye in a simulated environment	Demonstrate correct technique of removal of foreign body from the eye in a simulated environment	DOAP session during clinical posting Logbook	1st clinical posting	Skill assessment Logbook	
OP3.9	Demonstrate the correct technique of instillation of eye drops in a simulated environment	Demonstrate the correct technique of instillation of eye drops in a simulated environment	DOAP session during clinical posting Logbook	1st clinical posting	Skill assessment Logbook	
OP3.10	Demonstrate the correct technique of applying an eye pad	Demonstrate the correct technique of applying an eye pad	DOAP session during clinical posting Logbook	1st clinical posting	Skill assessment Logbook	
Topic: Cornea Number of Competencies: (10)						
OP4.1	Enumerate, describe and discuss the types and causes of	Discuss the pathogenesis of corneal ulcer Discuss the clinical features based on	Lecture	6th term	MCQs/SAQ/ Viva voce Skill	Essay/SAQ



		etiological agent Elicit signs and symptoms of corneal ulcer Describe the general principles of management of corneal ulcers			assessment	
OP4.2	Enumerate and discuss the differential diagnosis of infective keratitis	Enumerate the causes of infective keratitis Compare and contrast the clinical features of bacterial and fungal corneal ulcer	Lecture, SGD	6th term	Written/ Viva voce	Essay/SAQ
OP4.3	Enumerate the causes of corneal edema	Enumerate the causes of corneal edema	Lecture	6th term	Written/ Viva voce	SAQ
OP4.4	Enumerate the causes and discuss the management of dry eye	Describe briefly the Physiology of Tear film Describe briefly the tests done to detect dry eyes Enumerate different modalities of treatment of dry eyes	Lecture, SGD	6th term	SAQs/ Viva voce	Essay/SAQ
OP4.5	Enumerate the causes of corneal blindness	Enumerate the causes of corneal blindness	Lecture, SGD	6th term	Written/ Viva voce	SAQ
OP4.6	Enumerate the indications and the types of keratoplasty	Enumerate the indications and the types of keratoplasty	Lecture, SGD	6th term	Viva voce	Essay/SAQ
OP4.7	Enumerate the indications and describe the methods of tarsorrhaphy	Enumerate the indications and describe the methods of tarsorrhaphy	Lecture	6th term	Written/ Viva voce	Essay/SAQ



OP4.8	Demonstrate technique of removal of foreign body in the cornea in a simulated environment	Demonstrate technique of removal of foreign body in the cornea in a simulated environment	DOAP during clinical posting	6th term	Logbook	SAQ
OP4.9	Describe and discuss the importance and protocols involved in eye donation and eye banking	Enumerate the contraindications for eye donation List all methods of corneal button storage	Lecture	6th term	Written/ Viva voce	Essay/SAQ
OP4.10	Counsel patients and family about eye donation in a simulated environment	Counsel patients and family about eye donation in a simulated environment	DOAP during clinical posting	1st clinical posting	Logbook	
Topic: Sclera Number of competencies: (02)						
OP5.1	Define, enumerate and describe the aetiology, associated systemic conditions, clinical features complications indications for referral and management of episcleritis	Define scleritis Discuss the etiology of scleritis	Lecture, SGD	6th term	Written/ Viva voce	Essay/SAQ
OP5.2	Define, enumerate,	Describe the clinical features, and	Lecture,	6th	Written/ Viva	Essay/SAQ



	and describe the etiology, associated systemic conditions, clinical features, complications, indications for referral and management of scleritis	treatment of scleritis Enumerate the complications of scleritis	SGD	term	voce	
Topic: Iris and Anterior chamber Number of Competencies (10)						
OP6.1	Describe clinical signs of intraocular inflammation and enumerate the features that distinguish granulomatous from non-granulomatous inflammation. Identify acute iridocyclitis from chronic condition	Describe the etiology, clinical features of iridocyclitis Describe the distinguishing features of granulomatous and non- granulomatous iridocyclitis What is the etiology of granulomatous iridocyclitis	Lecture, SGD	6 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
OP6.2	Identify and distinguish acute iridocyclitis from chronic iridocyclitis	Define acute and chronic iridocyclitis Mention the differentiating features between acute and chronic iridocyclitis	Lecture, SGD	6 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
OP6.3	Enumerate systemic conditions that can present as	Enumerate the systemic conditions associated with iridocyclitis Enumerate the other ocular	Lecture, SGD	6 th term	MCQs/SAQ/ Viva voce	Essay/SAQ



	Identify and describe their ocular manifestations	manifestations				
OP6.4	Describe and distinguish hyphema and hypopyon	What is hyphema and what are its causes How will you manage a case of hyphema What is a hypopyon and what are its causes	Lecture	6 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
OP6.5	Describe and discuss the angle of the anterior chamber and its clinical correlates	Describe the anatomy of the angle of the anterior chamber How will you grade the angle of the anterior chamber	Lecture	6 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
OP6.6	Identify and demonstrate the clinical features and distinguish and diagnose common clinical conditions affecting the anterior chamber	Describe the clinical features of Primary open angle glaucoma Describe the management of POAG What is Trabeculectomy and describe its steps Describe the clinical features and management of Primary angle closure glaucoma Describe the clinical features and management of congenital glaucoma	Lecture, SGD	6 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
OP6.7	Enumerate and discuss the aetiology, the clinical distinguishing features of shallow	What are the causes of shallow and deep anterior chamber What is gonioscopy	Lecture, SGD	6 th term	MCQs/SAQ/ Viva voce	Essay/SAQ



	the deep anterior chamber. Choose appropriate investigations for patients with above conditions of the anterior chamber	What is perimetry and what are the visual field changes in glaucoma What is tonometry and how is it measured Demonstrate digital tonometry				
OP6.8	Enumerate and choose the appropriate investigation for patients with conditions affecting the Uvea	Describe the investigations in a patient with iridocyclitis	Lecture, SGD	6 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
OP6.9	Choose the correct local and systemic therapy for conditions of the anterior chamber and enumerate their indications, adverse events and interactions	Describe the management of a patient with iridocyclitis Enumerate the side effects of steroid use Discuss various routes of administration of steroids in ocular disease	Lecture, SGD	6 th term	MCQs/SAQ/ Viva voce	Essay/SAQ



OP6.00	Counsel patients with conditions of the iris and anterior chamber about their diagnosis, therapy and prognosis in an empathetic manner in a simulated environment	Counsel a patient with uveitis regarding the need for compliance	DOAP during clinical posting	1 st posting	OSCE	OSCE/ short case examination
Topic: Lens Number of Competencies: (06)						
OP7.1	Describe the surgical anatomy and the metabolism of the lens	Describe the anatomy of the lens Describe the metabolism of the lens	Lecture	6 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
OP7.2	Describe and discuss the etio-pathogenesis, stages of maturation and complications of cataract	Describe the etiopathogenesis of senile cataract Stages of cortical and nuclear cataract Complications of senile cataract Discuss etiology and morphology of complicated cataract	Lecture/SGD	6 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
OP7.3	Demonstrate the correct technique of ocular examination in a patient with a cataract	Differentiate between immature, mature and hypermature cataract Demonstrate the presence of iris shadow Macular function tests	DOAP during clinical posting	1 st posting	OSCE	OSCE/short case examination
OP7.4	Enumerate the types of cataract surgery and describe the steps, intra-operative	Describe the steps of cataract surgery Mention the intraoperative complications	SGD/Lecture	6 th term	MCQs/SAQ/ Viva voce	Essay/SAQ



	and postoperative complications of extracapsular cataract extraction surgery.	Mention the early and late postoperative complications Treatment of After cataract				
OP7.5	To participate in the team for cataract surgery	Discuss the preoperative preparation of a patient for cataract surgery Experience a walkthrough of a single patient from advising for surgery till discharge of the patient	Learner-doctor	2 nd posting	OSCE	OSCE/short case examination
OP7.6	Administer informed consent and counsel patients for cataract surgery in a simulated environment	Administer informed consent and counsel patients for cataract surgery in a simulated environment	DOAP during clinical posting	2 nd posting	OSCE	OSCE/short case examination
Topic: Retina & optic Nerve Number of Competencies (05)						
OP8.1	Discuss the aetiology, pathology, clinical features and management of vascular occlusions of the retina	Describe the etiology, pathology, clinical features, and management of Retinal vein occlusions Describe the etiology, pathology, clinical features, and management of Retinal artery occlusions What is cherry red spot and what are its causes	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
OP8.2	Enumerate the indications for laser therapy in the treatment of retinal diseases (including retinal detachment,	What is the pathogenesis of diabetic retinopathy What are the stages of diabetic retinopathy and maculopathy	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ



	What are the generations, diabetic retinopathy & hypertensive retinopathy)	What is the management for each of the stages What are the grades of hypertensive retinopathy? What is Keith Wagner classification Enumerate the types of retinal detachment and its management What is age related macular degeneration? What are the clinical features and management				
OP8.3	Demonstrate the correct technique of a fundus examination and describe and distinguish the fundoscopic features in a normal condition and in conditions causing an abnormal retinal exam	Demonstrate the correct technique of using a direct ophthalmoscope. Describe a normal fundus with the help of a diagram	DOAP in skills lab	6-7 th term	OSCE	
OP8.4	Enumerate and discuss treatment modalities in management of diseases of the retina	Enumerate the various disease conditions of the retina Enumerate the treatment modalities of the above conditions	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
OP8.5	Describe and discuss the correlative anatomy, aetiology, clinical manifestations,	Describe the anatomy of the Optic nerve Describe the clinical features, investigations and management of	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ



	Diagnostic tests, imaging and management of diseases of the optic nerve and visual pathway	Optic neuritis Describe the clinical features, stages and fundus picture, investigations, and management of Papilledema Describe the clinical features, classification, investigations and management of Optic Atrophy Describe the anatomy of the visual pathway Describe the visual field defects occurring in diseases affecting the visual pathway Describe the pupillary pathway Describe the clinical features of the various pupillary abnormalities- Hutchisons pupil, ARP, Adies Pupil, Marcus Gunn Pupil Demonstrate swinging flashlight test				
PA36.1	Describe the etiology, genetics, pathogenesis, pathology, presentation, sequelae, and complications of retinoblastoma	Discuss the pathogenesis, histopathology and genetics of retinoblastoma Enumerate the causes of leukocoria Describe the staging and clinical features of retinoblastoma Discuss the treatment options for the various stages of retinoblastoma	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ

Topic: Miscellaneous Number of Competencies (05) Number of procedures that require certification: (01)



OP9.1	Demonstrate the correct technique to examine extra ocular movements (Unocular & Binocular)	List the extraocular muscles, their insertions, and their actions Demonstrate the correct technique to examine extra ocular movements (Unocular & Binocular)	DOAP during clinical posting	1 st & 2 nd posting	Logbook	
OP9.2	Classify, enumerate the types, methods of diagnosis and indications for referral in a patient with heterotropia/ strabismus	List the types of strabismus What are the differences between Paralytic squint and Concomitant squint Enumerate and demonstrate the tests done in a case of Squint (Hirschberg's test, Head posture) List the conditions in which a patient with strabismus has to be referred	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
OP9.2	Describe the role of refractive error correction in a patient with headache and enumerate the indications for referral	Enumerate the causes of headache and list the differentiating features to suggest an ocular cause List the type of headaches which require referral	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
OP9.4	Enumerate, describe and discuss the causes of avoidable blindness and the National Programs for Control of Blindness (including vision 2020)	What are the causes of avoidable blindness What is NPCB. What are the diseases included in this What is vision 2020 Define legal blindness, social blindness and economical blindness	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
OP9.5	Describe the evaluation and	List the types of ocular injuries	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ



	Outline the steps involved in the stabilisation, initial management and indication for referral in a patient with ocular injury	List the effects of blunt trauma to the eye List the steps of initial management of chemical injuries Demonstrate the correct method of eye irrigation List the steps of initial management of an open globe injury				
Integration – Anatomy						
AN30.5	Explain effect of pituitary tumours on visual pathway	Describe the visual field changes in pituitary tumors Discuss the anatomical basis of VF changes in pituitary lesions	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
AN31.3	Describe anatomical basis of Horner's syndrome	What is Horner's syndrome? Differentiate acquired from congenital HS Describe the anatomical basis for HS due to various causes	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
AN31.5	Explain the anatomical basis of oculomotor, trochlear and abducent palsy	Describe the anatomy of the 3rd, 4th and 6th cranial nerves Enumerate the causes of 3rd, 4th and 6th cranial nerve palsies	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
AN41.1	Describe & demonstrate parts and layers of eyeball		Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
AN41.2	Describe the anatomical aspects of cataract, glaucoma & central		Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ



AN412	Describe the position, nerve supply and actions of intraocular muscles		Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
Integration- Physiology						
PY10.17	Describe and discuss functional anatomy of eye, physiology of image formation, physiology of vision including colour vision, Refractive errors, colour blindness, Physiology of pupil and light reflex	Describe the theories of color vision Describe the pupillary pathway Describe the clinical features of the various pupillary abnormalities	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
PY10.18	Describe and discuss the physiological basis of lesion in visual pathway	Draw a neat, labelled diagram of the visual pathway Describe the field defects of lesions affecting the visual pathway	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
PY10.19	Describe and discuss auditory & visual evoke potentials		Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
PY10.20	Demonstrate testing of visual acuity, colour and field of vision in a simulated environment	Assess visual acuity, colour vision and visual field in a simulated patient	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ
PH1.58	Describe drugs used	Describe the mechanism of action,	Lecture/SGD	7 th	MCQs/SAQ/	Essay/SAQ



		dosage, duration, modes of delivery and sideeffects of the following groups of drugs used in Ophthalmology Anti-glaucoma drugs, antibiotics, antifungals, mydriatic and cycloplegics, steroids		term	Viva voce	
IM24.15	Describe and discuss the aetiopathogenesis, clinical presentation, identification, functional changes, acute care, stabilization, management and rehabilitation of vision and visual loss in the elderly	List the causes of acute painless loss of vision in the elderly and their systemic causes List the causes of acute painful loss of vision in the elderly and their systemic causes Discuss the systemic investigations that isrequired in acute loss of vision in the elderly Discuss the treatment of acute loss of vision in the elderly	Lecture/SGD	7 th term	MCQs/SAQ/ Viva voce	Essay/SAQ

Summary of student assessment for the undergraduate (MBBS)Curriculum in Ophthalmology

Assessment

Eligibility to appear for university examinations is dependent on fulfilling criteria in two main areas – attendance and internal assessment marks

Attendance

Attendance requirements are 75% in theory and 80% in clinical postings for eligibility to appear for the examinations in Ophthalmology.

75% attendance in AETCOM Module is required for eligibility to appear for final examination in 3rd professional year 3 part 1.

Internal Assessment

Progress of the medical learner shall be documented through structured periodic assessment that includes formative and summative assessments. Logs of skill-based training shall be also maintained.

There shall be no less than three internal assessment examinations in Ophthalmology. An end of posting clinical assessment shall be conducted for each of the Ophthalmology clinical posting.

Day to day records and logbook (including required skill certifications) should be given importance in internal assessment. Internal assessment should be based on competencies and skills.



Learners must secure at least 50% marks of the total marks (combined in theory and clinical; not less than 40 % marks in theory



and practical separately) assigned for internal assessment in Ophthalmology in order to be eligible for appearing at the final University examination.

Internal assessment marks will reflect as separate head of passing at the summative examination.

The results of internal assessment should be displayed on the notice board within 1-2 weeks of the test.

Remedial measures should be offered to students who are either not able to score qualifying marks or have missed on some assessments due to any reason.

Learners must have completed the required certifiable competencies for that phase of training and Ophthalmology logbook entry completed to be eligible for appearing at the final university examination.

AETCOM assessment will include: (a) Written tests comprising of short notes and creative writing experiences, (b) OSCE based clinical scenarios / viva voce.

University examinations

Third Professional Part I shall be held at end of third Professional part 1 of training (12 months) in the subjects of Ophthalmology, Otorhinolaryngology, Community Medicine and Forensic Medicine and Toxicology

University examinations are to be designed with a view to ascertain whether the candidate has acquired the necessary knowledge, minimal level of skills, ethical and professional values with clear concepts of the fundamentals which are necessary for him/her to function effectively and appropriately as a physician of first contact. Assessment shall be carried out on an objective basis to the extent possible.

Marks allotted

Ophthalmology	Theory	Clinical examination
Total marks	100 marks	100 marks
	Long essay 2X10= 20	Two cases x40marks=80marks
	Short essay 8x5=40 marks	Viva voce 2x10=20marks
	Short answer question 10x3=30marks	
	MCQs 10x1=10marks	

The theory paper should include different types such as structured essays, short essays, Short Answers Questions (SAQ) and MCQs (Multiple Choice Questions). Marks for each part should be indicated separately.

All the question papers to follow the suggested blueprint (APPENDIX 1). It is desirable that the marks allotted to a particular topic are adhered to.

A minimum of 80% of the marks should be from the must know component of the curriculum. A maximum of 20% can be from the desirable to know component. All main essay questions to be from the must know component of the curriculum.

One main essay question to be of the modified variety containing a clinical case scenario. At least 30% of questions should be clinical case scenario based. Questions to be constructed to test higher cognitive levels.

Clinical examinations will be conducted in the hospital wards. Clinical cases kept in the examination must be common conditions that the learner may encounter as a physician of first contact in the community. Selection of rare syndromes and disorders as examination cases is to be discouraged. Emphasis should be on candidate's capability to elicit history, demonstrate physical signs, write a case record, analyze the case and develop a management plan.



Viva/oral examination should assess approach to patient management, emergencies, attitudinal, ethical and professional values. Candidate's skill in interpretation of common investigative data, X-rays, identification of specimens, ECG, etc. is to be also assessed.

At least one question in each paper of the clinical specialties in the University examination should test knowledge competencies acquired during the professional development programme. Skill competencies acquired during the Professional Development Programme must be tested during the clinical, practical and viva voce.

There shall be one main examination in an academic year and a supplementary to be held not later than 90 days after the declaration of the results of the main examination.

Pass criteria

Internal Assessment: 50% combined in theory and practical (not less than 40% in each) for eligibility for appearing for University Examinations

University Examination: Mandatory 50% marks separately in theory and clinicals (clinicals = clinical + viva)

The grace marks up to a maximum of five marks may be awarded at the discretion of the University to a learner for clearing the examination as a whole but not for clearing a subject resulting in exemption.

Appointment of Examiners

Person appointed as an examiner in the subject must have at least four years of total teaching experience as assistant professor after obtaining postgraduate degree in the subject in a college affiliated to a recognized/approved/permitted medical college.

For the Practical/ Clinical examinations, there shall be at least four examiners for 100 learners, out of whom not less than 50% must be external examiners. Of the four examiners, the senior-most internal examiner will act as the Chairman and coordinator of the whole examination programme so that uniformity in the matter of assessment of candidates is maintained.

Where candidates appearing are more than 100, two additional examiners (one external & one internal) for every additional 50 or part there



of candidates appearing, be appointed.

All eligible examiners with requisite qualifications and experience can be appointed as internal examiners by rotation External examiners may not be from the same University.

There shall be a Chairman of the Board of paper-setters who shall be an internal examiner and shall moderate the questions. All theory paper assessment should be done as central assessment program (CAP) of concerned university.

Course outcome and assessment methods:

Sl.no.	Course outcome	Specific learning objectives	Formative assessment	Summative assessment
1.	Describe the applied anatomy, physiology and biochemical attributes, pathophysiology, clinical features, and management of diseases of the normal eye and adnexa.	- To describe the applied anatomy, physiology and biochemical attributes of cornea, lens and retina. - To pathophysiology, clinical features, and management of diseases of the normal eye and adnexa.- assessment	MCQs/SAQ/ Viva voce	Essay/SAQ
2	Demonstrate the steps in performing the visual acuity assessment for distance vision,nearvision,colour vision,the pin hole test and the menaceand blink reflexes(OP1.3)	- Assess visual acuity using Snellen's chart Demonstrate use of pin hole in visual acuity testing and interpret the findings Assess near vision using Times new Roman charts Elicit the blink reflexand menace reflexin an adult patient - Assess color vision using Ishihara's color plates	Skill assessment during clinics Logbook	OSCE or short case



3. Elicit a detailed clinical history and perform an ocular examination : torch light examination perform an external inspection, flip an eyelid, perform pupillary reflexes, test corneal sensitivity, perform a basic eye motility exam , visual fields with

- To perform torch light examination of eye
- To perform lid eversion both upper and lower
- To perform pupillary reflexes,
- To test corneal sensitivity,
- To perform a basic eye motility exam ,
- To demonstrate visual field testing

Skill
assessment
during clinics
Logbook

OSCE



		with confrontation method		
4.	Diagnose common problems include the following: Red eye, acute visual loss, refractive errors, conjunctivitis, chalazion, common minor trauma such as corneal erosion, cataract, acute congestive glaucoma, retinal diseases such as diabetic retinopathy, hypertensive retinopathy, retinal detachment.	• Red eye • Acute visual loss • Refractive errors • Conjunctivitis • Chalazion • Common minor trauma such as corneal erosion • Cataract • Administer informed consent and counsel patients for cataract surgery in a simulated environment and participate in the team for cataract surgery. • Acute congestive glaucoma • Retinal diseases such as diabetic retinopathy, hypertensive retinopathy, retinal detachment.	Short case Essay/SAQ Mini CEX Mini CEX Short case SAQ Skill assessment during clinics ,Logbook, case presentation, Essay/SAQ/ AETCOM Certification Essay/SAQ Essay/SAQ	SAQ Essay/SAQ Essay/SAQ Essay/SAQ Short case/SAQ SAQ Case presentation, Essay/SAQ/MCQ/VI VA-VOCE Certification OSCE Essay/SAQ/MCQ/VI VA-VOCE
5.	Know about National program for control of blindness, Vision 2020, eye banking.	• Enumerate causes of avoidable blindness • Enumerate the goals and objectives of NPCBVI • To know goals and objectives of VISION 2020 • To describe the functioning of eye bank and basic information on eye donation	Short Essay/SAQ/MCQ Q AETCOM- counseling for eye donation	Short Essay/SAQ/MCQ/VI va-voce



6.	Recognize and document ophthalmic emergency and timely referral	Adequately synthesize, triage and communicate visual and eye complaints to the ophthalmologists / neurologists/physician.	Mini CEX/short case	SAQ/MCQ/VIVA-VOCE

APPENDIX 1: Blueprint for **Ophthalmology theory** **Examinations**

DEPARTMENT OF OPHTHALMOLOGY

BLUEPRINTING IN ASSESSMENT OPHTHALMOLOGY BLUEPRINTING FORMAT (COMPLETE SYLLABUS)

Sl. No.	Topic/System	Impact (I)	Frequency (F)	I* F	W=I*F/Σ (IF)	Domain	Assessment type
1	Conjunctiva	2	3	6	7.14	Psychomotor Cognitive	CEX Long essay short essay short answer, MCQ
2.	Cornea	2	3	6	7.14	Cognitive Psychomotor	CEX Long essay short essay short answer, MCQ
3	Sclera	1	1	1	1.19	Cognitive	Short answer, MCQ
4	Uveal tract	2	3	6	7.14	Cognitive	Short answer, MCQ
5	Lens	3	3	9	10.71	Cognitive Psychomotor	CEX Long essay short essay short answer, MCQ

6	Glaucoma	3	3	9	10.71	Cognitive	Long essay short essay short answer
7	Vitreous	1	1	1	1.19	Cognitive	Short answer, MCQ



		2	3	6	7.14	Cognitive	Long essay short essay short answer, MCQ
9	Neuroophthalmology	1	1	1	1.19	Cognitive	Short answer, MCQ
10	Strabismus	1	1	1	1.19	Cognitive	Short answer, MCQ
11	Eyelids	2	1	2	2.38	Cognitive	Short answer Short essay,MCQ
12	Lacrimal apparatus	3	2	6	7.14	Cognitive Psychomotor	Short answer short essay CEX,MCQ
13	Orbit	1	1	1	1.19	Cognitive	Short answer, MCQ
14	Ocular injuries	3	3	9	10.71	Cognitive	Short essay Short answer, MCQ
15	Ocular pharmacology	2	2	4	4.76	Cognitive	Short answer short essay,MCQ
16	Lasers and cryotherapy in Ophthalmology	1	1	1	1.19	Cognitive	Short answer, MCQ
17	Systemic Ophthalmology	2	1	2	2.38	Cognitive	Short answer short essay,MCQ



RMAAH
Medical College

	Optics	2	2	4	4.76	Cognitive	Short answer short essay, MCQ
19	Refraction	3	3	9	10.71	Cognitive Psychomotor	Long essay short essay short answer, MCQ
Total		37		84			