



**RAMAIAH
UNIVERSITY**
OF APPLIED SCIENCES

M.S. Ramaiah University of Applied Sciences
Programme Structure and Course Details
Of
MS Orthopedics 2022 onwards

M.S. Ramaiah University of Applied Sciences
Ramaiah Medical College

Registrar
M.S. Ramaiah University of Applied Sciences
Bangalore - 560 054

Principal and Dean
M.S. Ramaiah Medical College and Hospital
M.S. Ramaiah University of Applied Sciences
Bangalore - 560054

Dean - Academics
M.S. Ramaiah University of Applied Sciences
Bangalore-560054



**RAMAIAH
UNIVERSITY**
OF APPLIED SCIENCES

M.S. Ramaiah University of Applied Sciences

Programme Specifications

MS Orthopedics Programme 2022 onwards

Programme Code: MD148

M.S. Ramaiah University of Applied Sciences

Ramaiah Medical College

Shalini

Principal and Dean

M.S. Ramaiah Medical College and Hospital

M.S. Ramaiah University of Applied Sciences

Bangalore-560054



Malayappa
Dean - Academics
M.S. Ramaiah University of Applied Sciences
Bangalore-560054

University's Vision, Mission and Objectives

The M. S. Ramaiah University of Applied Sciences (MSRUAS) will focus on student-centric professional education and motivates its staff and students to contribute significantly to the growth of technology, science, economy and society through their imaginative, creative and innovative pursuits. Hence, the University has articulated the following vision and objectives.

Vision

MSRUAS aspires to be the premier university of choice in Asia for student centric professional education and services with a strong focus on applied research whilst maintaining the highest academic and ethical standards in a creative and innovative environment.

Mission

Our purpose is the creation and dissemination of knowledge. We are committed to creativity, innovation and excellence in our teaching and research. We value integrity, quality and teamwork in all our endeavors. We inspire critical thinking, personal development and a passion for lifelong learning. We serve the technical, scientific and economic needs of our Society.

Objectives

1. To disseminate knowledge and skills through instructions, teaching, training, seminars, workshops and symposia in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences to equip students and scholars to meet the needs of industries, business and society
2. To generate knowledge through research in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences to meet the challenges that arise in industry, business and society
3. To promote health, human well-being and provide holistic healthcare
4. To provide technical and scientific solutions to real life problems posed by industry, business and society in Engineering and Technology, Art and Design, Management and Commerce, Health and Allied Sciences, Physical and Life Sciences, Arts, Humanities and Social Sciences
5. To instill the spirit of entrepreneurship in our youth to help create more career opportunities in the society by incubating and nurturing technology product ideas and supporting technology backed business
6. To identify and nurture leadership skills in students and help in the development of our future leaders to enrich the society we live in
7. To develop partnership with universities, industries, businesses, research establishments, NGOs, international organizations, governmental organizations in India and abroad to enrich the experiences of faculties and students through research and developmental programme



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Medha. Y. Rao

Dean - Academics

Programme Specifications: MS Orthopedics

Faculty	Ramaiah Medical College
Department	Orthopedics
Programme	MS Orthopedics
Programme Code	MS148
Dean of Faculty	Dr Shalini C Nooyi
Head of the Department	Dr Ashok Kumar P

1. **Title of the Award:** MS in Orthopedics.
2. **Mode of Study:** Full-Time
3. **Awarding Institution /Body:** M. S. Ramaiah University of Applied Sciences, Bengaluru
4. **Joint Award:** Not Applicable
5. **Teaching Institution:** Ramaiah Medical College
6. **Date of Programme Specifications:** September 2022
7. **Date of Programme approval by the academic Council of MSRUAS:** 27th September 2022
7. **Programme Approving Regulating Body and Date of Approval:** National Medical Council of India
8. **Rationale for the Programme**

The purpose of PG education is to create specialists who would provide high quality healthcare and advance the cause of science of orthopedics through research & training. Orthopedics is a highly specialized and technical discipline involving surgical and medical treatment of congenital, developmental, inflammatory, infective, traumatic, metabolic, neuromuscular, degenerative and oncologic disorders of the musculoskeletal systems. With a view to update, by inclusion of newer topics, and to provide a uniform syllabus and course contents in Indian universities and teaching medical institutions, the proposed guidelines provide course outlines based on recent developments in clinical medicine and other disciplines related to orthopedics.

Shalini



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M.S. Ramaiah University of Applied Sciences
Bangalore - 560054

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Programme objectives (PO) for MS Orthopedics Postgraduate students

- PO1.** Develop the knowledge, skills and attitude to be a competent Orthopaedic surgeon (C, P).
- PO2.** Demonstrate a commitment to excellence and continuous professional development with integrity, compassion and sensitivity to patient care. (A)
- PO3.** Acquire and develop the knowledge, skills and attitude required to be a competent and ethical researcher and teacher. (A, C, P)
- PO4.** Be able to independently diagnose fractures and be skilled in conservative, surgical procedures in orthopaedic traumatology, musculoskeletal conditions with a reasonable degree of professionalism and competence. (P)

Programme specific outcome (PSO) for MS Orthopedics Postgraduate students

- PSO1** -Demonstrate the ability to diagnose and treat all trauma patients using updated guidelines in orthopedics with special ability to maintain interdisciplinary coordination. (C, A, P)
- PSO2**- Demonstrate the ability to address all emotional issues in patients and family members in relation to diagnosis, treatment, rehabilitation and prognosis of Orthopedic conditions (C, A, P).
- PSO3** - Organize proper promotive and preventive care strategies in the community aimed at reducing the burden of care in accidental trauma (C, A, P).
- PSO4**-Lead and participate in planning and execution of team work related to establishment and maintenance of infrastructure related to orthopedics, conforming to the updated guidelines. (C, A,P)
- PSO5** - Plan and conduct research related to the topic(C)
- PSO6** - Demonstrate the ability to organize teaching / training sessions for students and health workers in topics related to orthopedic diseases and care. (P)

Note: A- Affective Domain, C- Cognitive Domain & P- Psychomotor Domain



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Course-PO-PSO Mapping

Course Code and name	Program Outcomes				Program Specific Outcomes					
	PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
MSCS13A Basic sciences as applied to orthopedics	3	3	2	3	3	2	1	2	1	2
MSCS14A Traumatology and rehabilitation	3	3	2	3	3	2	2	1	1	3
MSCS15A Orthopaedic diseases	3	3	2	3	3	2	2	1		2
MSCS16A General surgery as applied to orthopedics & recent advances	3	3	2	3	3	2	1	2		3
MSP504A Thesis-orthopedics			3						3	

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Dean - Academics
M.S. Ramiah University of Applied Sciences
Bangalore - 560054

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9. Regulations:**(A) Attendance, Progress and Conduct**

1. A candidate pursuing degree course should work in the concerned department of the institution for the full period as a full-time student. No candidate is permitted to run or work in clinic/laboratory/nursing home while studying postgraduate 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.
2. Each term shall be taken as a unit for the purpose of calculating attendance. Attendance of 80% every term is mandatory for appearing in the final university examination.
3. Every student shall attend symposia, seminars, conferences, journal review meetings, grand rounds, case presentation, clinics and lectures during each year as prescribed by the department and not absent himself / herself from work without valid reasons.
4. Every candidate is required to attend a minimum of 80% of the training during each academic term of the post graduate course. Provided further, leave of any kind shall not be counted as part of academic term without prejudice to minimum 80% attendance of training period every year.
5. Any student who fails to complete the course in the manner stated above shall not be permitted to appear for the University Examinations.

(B) Monitoring of progress of Studies

1. Work diary / Log Book - Every candidate shall maintain a work diary and record of his/her participation in the training programs conducted by the department such as journal reviews, seminars, etc. as per the model checklists and logbook specimen copy.
2. Special mention may be made of the presentations by the candidate as well as details of clinical or planning procedures, if any conducted by the candidate. The work diary shall be scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the university practical/clinical examination.
3. Procedure for defaulters: There will be a committee constituted by all teachers to review such situations. The defaulting candidate is counseled by the guide and head of the department. In extreme cases of default, the departmental committee may recommend that a defaulting candidate will be withheld from appearing in the examination, if she/he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

10. Teaching Learning Methods:

This being a highly dedicated PG specialty introducing several new concepts/subjects in the course, it is recommended to divide the entire course into two components consisting of First Year of BASIC CONCEPTS OF THE SPECIALTY and the next two years of INTENSIVE CLINICAL AND SURGICAL TRAINING IN THE SPECIALTY.

Didactic lectures are of least importance; seminars, journal clubs, 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.

The work up of a patient posted for surgery, including radiological and hematological investigations as relevant, pre-operative planning, procedure and implant selection, shall be given precedence. Students should have hands-on training in performing various surgical procedures and ability to interpret results of various tests/investigations.

Exposure to basic conservative and surgical treatment procedures should be given. Importance will be given to management of patient in the accident and emergency settings. 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.

It is particularly necessary to attend sub-specialty and symptom specific clinics. The development

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Principal and Dean

M.S. Ramiah Medical College and Hospital
M.S. Ramiah University of Applied Sciences
Bangalore-560054

Yeeha Y Rao
Dean - Academics

M.S. Ramiah University of Applied Sciences
Bangalore-560054

of independent skills is an important facet of postgraduate training. Joint meetings with physician colleagues, e.g., radiologists and pathologists play a valuable part in 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. Intradepartmental and interdepartmental conferences related to case discussions.
2. Ward rounds along with emergency admissions.
4. Pre-operative work-up and planning of procedures.
5. Operation theatre etiquette
6. Attendance at sub-specialty clinics
7. External rotation postings in departments like vascular surgery, plastic surgery, accident and emergency, neurosurgery.
8. Skills training
9. Conferences, Seminars, Continuing Medical Education (CME) Programmes.
10. Journal Club
11. Research Presentation and review of research work.
12. A postgraduate student of a postgraduate degree course in broad specialties would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.
13. Participation in workshops, conferences and presentation of papers etc.
14. Maintenance of records & Log books should be maintained to record the work done which shall be checked and assessed periodically by the faculty members imparting the training.
15. Postgraduate students shall be required to participate in the teaching and training programme of undergraduate students and interns.
16. Department should encourage e-learning activities.



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11. Innovative teaching learning practices

1. Theme based teaching learning activities e.g., Arthroplasty for a full month.
2. Focused discussion during journal club inculcates culture in the areas of research and publication
3. Faculty Lectures during 4th week: Helps in bridging the gap between what is presented during the month and what is not about particular topic. Also, it reinforces learning

12. Assessment

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only also helps teachers to evaluate students, but also students to evaluate themselves. The monitoring will be done by the staff of the department based on participation of students in various teaching/learning activities.

1. Formative assessment during 4th week of every month to include methods like pedagogy, X-rays, CT and MRI interpretation, Viva, standardized patients, MCQs, Open book exams, OSCE will be done. Impact: SWOT analysis can be done and timely counselling can be done.
2. Theory paper covering basic principles at the end of 1st year. FA at the end of second year will be on common fractures, orthopedic afflictions. Mock SA will be conducted in the same pattern as university exams one month before the final exams.
3. Teaching skills: Candidates are encouraged to teach undergraduate medical students and paramedical students, if any. In addition, the second-year student acts as a mentor for the immediate junior in all aspects of the course.
4. Pedagogy as a tool in formative assessment helps the student to be a better teacher.



Shalini

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Scheme of Examination:**A. Theory (Written Paper) 400 marks**

The examinations shall be organized on the basis of 'Grading' or 'Marking system' to evaluate and to certify post graduate 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 passing examination as a whole. The examination for MS shall be held at the end of 3rd academic year. There shall be four question papers, each of three hours' duration. Each paper shall consist of 10 short essay questions each carrying 10 marks. Total marks for each paper will be 100. Questions on recent advances may be asked in any or all the papers.

Completion of thesis topic and submission to the university provides eligibility to attend the exam. Details of distribution of topics for each paper will be as follows.

Name of the course	Course Code	Topics	Marks
Basic Principles as applied to orthopedics	MSC513A	Surgical anatomy, approaches; healing, complications of fractures, orthopedic infections, amputations; basic and advanced trauma management	100
Traumatology and rehabilitation	MSC514A	Conservative and surgical treatment of fractures, implants in orthopedics, rehabilitation,	100
Orthopaedic diseases	MSC515A	Limb deformities, metabolic bone diseases, regional orthopedic conditions	100
General Surgery as applied to Orthopedics & recent advances	MSC516A	Polytrauma management, radiological modalities, advances in orthopedics	100
Thesis-Orthopedics	MSP504A	Approval 6 months before the final Examination	

A. Clinical: 200marks

One long case of 80

Three short cases of 40 each.

B. VivaVoice: 100 marks**1) Viva-Voce Examination: (80Marks)**

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach, expression and interpretation of data. It includes all components of course contents. In addition, candidates may be also be given case reports, charts, gross specimens, pathology slide, Instruments, X-rays, ultrasound, CT scan, MRI scan images for interpretation. It includes discussion on dissertation also.

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2) Pedagogy Exercise:(20Marks)

A topic be given to each candidate in the beginning of clinical examination.
He/she is asked to make a presentation on the topic for 8-10 minutes.

C. Total Marks Distribution:

Maximum marks for M.S degree course	Theory	Practical	Viva	Grand Total
	400	200	100	700



Shalini

4/20/20
Dean - Academics
M.S. Ramiah University of Applied Sciences
Bangalore-560054

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Principal and Dean
M.S. Ramiah Medical College and Hospital
M.S. Ramiah University of Applied Sciences
Bangalore-560054

Annexures

- Annexure 1_ Competency List
- Annexure 2_Sample of monthly schedules
- Annexure 3_PG outside posting policy
- Annexure 4_Logbook entry
- Annexure 5_Students appraisal form

Shalini

Principal and Dean

M.S. Ramaiah Medical College and Hospital

M.S. Ramaiah University of Applied Sciences

Bangalore-560054



Malayappa
Dean - Academics

M.S. Ramaiah University of Applied Sciences
Bangalore-560054

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Annexure 1Competency List**A. Cognitive domain**

At the end of the M.S. Orthopedics programme, the post graduate student should be able to:

1. Demonstrate sufficient understanding of the basic sciences relevant to orthopaedic speciality through a problem based approach.
2. Describe the Principles of injury, its mechanism and mode, its clinical presentation, plan and interpret the appropriate investigations, and institute the management of musculoskeletally injured patient.
3. Identify and describe the surface anatomy and relationships within of the various bones, joints, ligaments, major arteries, veins and nerves of the musculoskeletal system of the spine, upper limb, lower limb and the pelvis, chest, abdomen and head & neck.
4. Define and describe the pathophysiology of shock (circulatory failure).
5. Define and describe the pathophysiology of Respiratory failure
6. Describe the principles and stages of bone and soft tissue healing
7. Understand and describe the metabolic, nutritional, endocrine, social impacts of trauma and critical illness.
8. Enumerate, classify and describe the various bony/soft tissue injuries affecting the axial and the appendicular skeletal system in adults and children.
9. Describe the principles of internal and external fixation for stabilization of bone and joint injuries.
10. Describe the mechanism of homeostasis, fibrinolysis and methods to control haemorrhage
11. Describe the physiological coagulation cascade and its abnormalities
12. Describe the pharmacokinetics and dynamics of drug metabolism and excretion of analgesics, anti inflammatory, antibiotics, disease modifying agents and chemotherapeutic agents.
13. Understanding of biostatistics and research methodology
14. Describe the clinical presentation, plan and interpret investigations, institute management and prevention of the following disease conditions
 - a. Nutritional deficiency diseases affecting the bones and joints



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- b. Deposition arthropathies
- c. Endocrine abnormalities of the musculoskeletal system
- d. Metabolic abnormalities of the musculoskeletal system
- e. Congenital anomalies of the musculoskeletal system
- f. Developmental skeletal disorder of the musculoskeletal system

15. Describe the pathogenesis, clinical features plan and interpret investigations and institute the management in adults and children in

- a. Tubercular infections of bone and joints (musculoskeletal system)
- b. Pyogenic infections of musculoskeletal system
- c. Mycotic infections of musculoskeletal system
- d. Autoimmune disorders of the musculoskeletal system
- e. Rheumatoid arthropathy, Ankylosing spondylitis, seronegative arthropathy
- f. Osteoarthritis and spondylosis

16. Describe the pathogenesis, clinical presentation, plan and interpret investigations and institute appropriate treatment in the following conditions:

- a. Post polio residual paralysis
- b. Cerebral palsy
- c. Muscular dystrophies and myopathies
- d. Nerve Injuries
- e. Entrapment neuropathies

17. Identify the diagnosis and describe management of musculoskeletal manifestation of AIDS and HIV infection

18. Describe the aetiopathogenesis, identify, plan and interpret investigation and institute the management of osteonecrosis of bones.

19. Identify situations requiring rehabilitation services and prescribe suitable orthotic and prosthetic appliances and act as a member of the team providing rehabilitation care

20. Identify a problem, prepare a research protocol, conduct a study, record observations, analyse data, interpret the results, discuss and disseminate the findings.

21. Identify and manage emergency situation in disorders of musculoskeletal system

22. Understanding of the basics of diagnostic imaging in orthopedics like:

- a. Plain x-ray
- b. Ultrasonography
- c. Computerised axial tomography
- d. Magnetic resonance imaging
- e. PET scan
- f. Radio Isotope bone scan
- g. Digital Subtraction Angiography (DSA)
- h. Dual energy x-ray Absorptiometry
- i. Arthrography

23. Describe the aetiopathogenesis, clinical presentation, Identification, Plan investigation and institute treatment for oncologic problems of musculoskeletal system both benign and malignancies, primary and secondary.

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24. Understand the basics, principles of biomaterials and orthopaedic metallurgy
25. Describe the principles of normal and abnormal gait and understand the biomedical principles of posture and replacement surgeries.
26. Describe social, economic, environmental, biological and emotional determinants of health in a given patient with a musculoskeletal problem.

B. Affective Domain:

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, and interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
2. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
3. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers and paramedical staff, and for effective teaching. Attitudes including Communication skills and Professionalism

a. Communication skills:

Exhibits participation in honest, accurate health related information sharing in a sensitive and suitable manner

1. Recognizes that being a good communicator is essential to practice effectively
2. Exhibits effective and sensitive listening skills
3. Recognises the importance and timing of breaking bad news and knows how to communicate
4. Exhibits participation in discussion of emotional issues
5. Exhibits leadership in handling complex and advanced communication
6. Recognizes the importance of patient confidentiality and the conflict between confidentiality and disclosure
7. Able to establish rapport in therapeutic bonding with patients, relatives and other stakeholders through appropriate communication
8. Able to obtain comprehensive and relevant history from patients/relatives
9. Able to counsel patients on their condition and needs

b. Teamwork: Seek cooperation. Coordination and communication among treating specialties and paramedical staff

c. Counseling of relatives: regarding patients condition, seriousness, bereavement and counseling for organ donation in case of brain stem death

d. Leadership: Trauma prevention, education of the public, paramedical and medical persons. Advocacy: with the government and other agencies towards cause of trauma care

e. Ethics: The Code of Medical Ethics as proposed by Medical Council of India will be learnt and observed.

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Shaline
Principal and Dean

M.S. Ramiah Medical College and Hospital
M.S. Ramiah University of Applied Sciences
Bangalore-560054

1/20/22

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M.S. Ramiah University of Applied Sciences
Bangalore-560054



C. Psychomotor domain

At the end of the first year of M.S. Orthopedics programme, the student should be able to:

1. Elicit a clinical history from a patient, do a physical examination, document in a case record, order appropriate investigations and make a clinical diagnosis
2. Impart wound care where applicable
3. Apply all types of POP casts/slabs, splints and tractions as per need
4. Identify shock and provide resuscitation
5. Perform aspiration of joints and local infiltration of appropriate drugs
6. Perform appropriate wound debridement
7. Perform arthrotomy of knee joint
8. Perform incision and drainage of abscess
9. Perform split thickness skin grafting
10. Perform fasciotomy
11. Apply external fixators
12. Apply skeletal tractions including skull tongs
13. Triage a disaster situation and multiple trauma patients in an emergency room
14. Perform on bone models, interfragmentary compression screws, external fixation, Tension band wiring and Broad plating
15. Perform closed reduction of common dislocations like shoulder and common fractures like collar fracture, supracondylar fracture.
16. Perform on a cadaver standard surgical approaches to the musculo skeletal system

At the end of the second year of M.S. Orthopedics course, the student should be able to:

1. Take an informed consent for standard orthopaedic procedures
2. Perform closed/open biopsies for lesions of bone, joints and soft tissues
3. Perform split thickness skin grafting and local flaps
4. Perform on bone models, internal fixation with k-wires, screws, plates. Dynamic hip/condylar screws/nailing.
5. Perform sequestrectomy and saucerisation
6. Perform arthrotomy of joints like hip/shoulder, ankle, elbow
7. Perform repair of open hand injuries including tendon repair
8. Perform arthodesis of small joints
9. Perform diagnostic arthroscopy on models and their patients
10. Perform carpal tunnel/tarsal tunnel release
11. Apply ilizarov external fixator
12. Perform soft tissue releases in contractures, tendon lengthening and correction of deformities
13. Perform amputations at different levels
14. Perform corrective surgeries for CTEV, DDH, Perthes/ skeletal dysplasia

At the end of the third year of M.S. Orthopedics programme, the student should be able to:

1. Assist in the surgical management of polytrauma patient
2. Assist in Arthroplasty surgeries of hip, knee, shoulder and the ankle
3. Assist in spinal decompressions and spinal stabilizations



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4. Assist in operative arthroscopy of various joints
5. Assist /perform arthrodesis of major joints like hip, knee, shoulder, elbow
6. Assist in corrective osteotomies around the hip, pelvis, knee, elbow, finger and toes
7. Assist in surgical operations on benign and malignant musculoskeletal tumour including radical excision and custom prosthesis replacement.
8. Assist in open reduction and internal fixations of complex fractures of acetabular, pelvis, IPSI lateral floating knee/elbow injuries, shoulder girdle and hand
9. Assist in spinal deformity corrections
10. Independently perform closed/open reduction and internal fixation with DCP, LCP, intramedullary nailing, LRS
11. Assist in limb lengthening procedures
12. Assist in Revision surgeries
13. Provide pre and post OP care
14. Perform all clinical skills as related to the speciality.

gc

Registrar
M.S. Ramaiah University of Applied Sciences
Bangalore - 560 054

Shalini

Meetha. Y Rao
Dean - Academics

M.S. Ramaiah University of Applied Sciences
Bangalore-560054

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Annexure 2**Monthwise Teaching Schedule For Post Graduates Department Of Orthopaedics**

MONTH	SITE	Teacher
January	Trauma & basic sciences	Moderator
February	Basic sciences	Moderator
March	Shoulder	Moderator
April	Elbow, Hand	Moderator
May	Spine, Pelvis	Moderator
June	Hip, Femur	Moderator
July	Knee, Ankle	Moderator
August	Foot	Moderator
September	Sports Injuries	Moderator
October	Arthritis, Infections	Moderator
November	Paediatric Orthopaedics	Moderator
December	Miscellaneous	Moderator

Note:

1. The respective faculty will be in charge of the entire process...planning, implementation and assessment.
2. It is preferable to put the time table latest by 20th of previous month.
3. PGs are expected to keep in touch with the respective teachers well ahead of the class.



Shalini
Principal and Dean
M.S. Ramaiah Medical College & Hospital
M.S. Ramaiah University of Applied Sciences

Yashraj
Dean - Academics
M.S. Ramaiah University of Applied Sciences
Bangalore-560054

Annexure 3
April Teaching Schedule For Post Graduates
Topic: Elbow, Hand

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1 Journal club	2 Case presentation	3 Grand rounds
4 Sunday	5 Examination of elbow	6 CRPS	7 Supracondylar fracture - paed	8 Upper limb neuropathies	9 Elbow arthritis	10 Grand rounds
11 Sunday	12 Radial head & neck fractures	13 Holiday	14 Cadaver class- elbow approaches	15 Distal humerus fractures	16 Case presentation	17 Grand rounds
18 Sunday	19 Functional anatomy of wrist and hand	20 Tendon injuries of wrist and hand	21 Cadaver class- forearm and approaches	22 Distal radius fractures	23 Examination of wrist and hand	24 Grand rounds
25 Sunday	26 Tendon transfers of wrist and hand	27 Carpal instability	28 Deformities of wrist & hand	29 Wrist arthroplasty, arthroscopy	30 Case presentation	

Instructions: -

- All classes will be based on discussion
- PPTS to be used only to show images /staging /RT planning details
- Both students should discuss with each other prior to the class and present
- The team shall discuss with the teacher atleast 3-5days before the date of the class.
- The week's doubts clarifications to be discussed with the faculty on Saturdays.
- All the best



Meena. Y. Rao
 Dean - Academics
 M.S. Ramaiah University of Applied Sciences
 Bangalore-560054

Shalini

Principal and Dean

M.S. Ramaiah University of Applied Sciences
 Bangalore-560054

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Annexure 4
Department Of Orthopedics

Policy For Outside Pg Postings

Year wise PG Posting

1. 1st year students are posted for 1 month each in the Departments of Emergency medicine
2. 2nd year students are posted for 2 weeks each in the Department of Plastic surgery, Neurosurgery & Vascular surgery and DRP for 3 months as per NMC regulations
3. During the 3rd year students will also have postings to Advanced learning center for cadaveric workshop for 1 week each

Shalini



Meena. Y Rao
Dean - Academics
M.S. Ramaiah University of Applied Sciences
Bangalore-560054

Principal and Dean
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Annexure 5
Logbook entry

Date	
Setting/method	
Presented/attended	
Summary in brief	
Reflection	
Teachers comments	

Student's signature

Guide's Signature



Shalini

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ANNEXURE-6

Postgraduate Students Appraisal Form Name of the PG Student Period of Training Duration:
to.....

Sl. No	Particulars	Not satisfactory (1,2,3)	Satisfactory (4,5,6)	More than Satisfactory (7,8,9,10)	Remarks
1	Journal based learning				
2	Patient care and rounds				
3.	Bedside teaching, Clinical seminars				
4.	Communication skills				
5.	Log book				
6.	Thesis work				
7.	CME/Outreach programmes/Conference presentations				
8.	Self-directed learning				
9.	Under-graduate teaching				
10.	Research/Publication				

Sign of the student

Sign of the assessor

Sign of Head of the Department



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Course Specifications MD Orthopedics

2022 onwards

Course Code: MSC513A

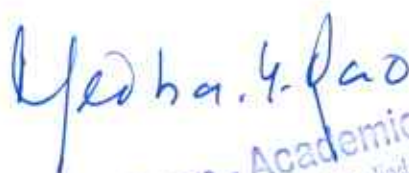


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Course Specifications

Course Title	Basic sciences as applied to Orthopedics
Course Code	MSC513A
Department	Orthopedics
Faculty	Ramaiah Medical College

Course summary:

This course is designed in such a way that the student will master the basics of surgical anatomy, exposures, bone and soft tissue healing, techniques of effective clinical examination, management of the injured patient ALS/BLS, imaging in orthopedics, integrating anatomy with disease, biomechanics and orthopaedic metallurgy

Course Outcomes:

CO 1: Demonstrate comprehensive knowledge of surgical anatomy, surgical exposures as relevant to orthopedics. (C)

CO 2: Demonstrate the understanding of various concepts of, complications of fractures, orthopedic infections, amputations. (C)

CO 3: Demonstrate the understanding of management of the injured patient. (C)

Course Content:**1. Basic Sciences**

1. Anatomy and function of joints
2. Bone structure and function
3. Growth factors and fracture healing
4. Cartilage structure and function
5. Structure and function of muscles and tendons
6. Tendon structure and function
7. Metallurgy in Orthopedics
8. Stem Cells in Orthopedic Surgery
9. Gene Therapy in Orthopedics

2. Metabolic Bone Diseases

1. Rickets and Osteomalacia
2. Osteoporosis
3. Scurvy
4. Mucopolysaccharidosis
5. Fluorosis
6. Osteopetrosis



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3. Endocrine Disorders

1. Hyperparathyroidism
2. Gigantism, Acromegaly

4. Bone and Joint Infections

1. Pyogenic Hematogenous Osteomyelitis - Acute and Chronic
2. Septic arthritis
3. Fungal infections
4. Miscellaneous infections
5. Gonococcal arthritis
6. Bone and joint brucellosis
7. AIDS and the orthopedic Surgeon (universal precautions)
8. Musculoskeletal Manifestations of AIDS
9. Pott's spine
10. Tubercular synovitis and arthritis of all major joints

5. Diseases of Joints

1. Osteoarthritis
2. Calcium Pyrophosphate Dihydrate (CPPD), Gout
3. Collagen diseases

6. Systemic Complications in Orthopedics

1. Shock
2. Crush syndrome
3. Disseminated Intravascular Coagulation (DIC)
4. Acute Respiratory Distress Syndrome (ARDS)

7. Arthrodesis

1. Arthrodesis of lower extremity and hip
2. Arthrodesis of upper extremity
3. Arthrodesis of spine

8. Amputations and Disarticulations

1. Amputations and disarticulations in the lower limb
2. Amputations and disarticulations in the upper limb

9. Triage, Disaster Management, BTLS and ATLS

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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes					
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
MSC513A Basic sciences as applied to Orthopedics	CO 1	3	1	2	3	3	1	2	1	2	2
	CO 2	3	1	2	3	3	1	2	1	2	2
	CO 3	3	1	2	3	3	1	2	1	2	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution											

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Course Specifications MD Orthopedics

2022 onwards

Course Code: MSC514A



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Course Specifications

Course Title	Traumatology and Rehabilitation
Course Code	MSC514A
Department	Orthopedics
Faculty	Ramaiah Medical College

Course Summary:

This course is designed in such a way that the student will master the evidence-based management of orthopaedic trauma (various bone and soft tissue injuries affecting the axial and appendicular skeletal system, in adults and children) with a focus on comprehensive treatment and rehabilitation.

Course Outcomes:

CO 1: Demonstrate the role of conservative treatment in various orthopedic trauma. (C,A,P)

CO 2: Demonstrate the role of surgery and implant selection in simple, compound and peri-articular fractures (C,A,P)

CO 3: Demonstrate the role of post-operative rehabilitation protocols in orthopedics. (C,A,P)

Course Content:**1. Fracture and Fracture-Dislocations**

General considerations

1. Definitions, types, grades, patterns and complications
2. Pathology of fractures and fracture healing
3. Clinical and Radiological features of fractures and dislocations
4. General principles of fracture treatment
5. Recent advances in internal fixation of fractures
6. Locking plate osteosyntheses
7. Less Invasive Stabilization System (LISS)
8. Ilizarov technique
9. Bone grafting and bone graft substitutes
10. Open fractures and soft tissue coverage in the lower extremity
11. Compartment syndrome
12. Fractures of the upper extremity and shoulder girdle
13. Fractures of the lower extremity
14. Fractures of the hip and pelvis
15. Malunited fractures
16. Delayed union and non-union of fractures
17. Fractures/dislocations and fracture - dislocations of spine



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2. Dislocations and Subluxations

1. Acute dislocations
2. Old unreduced dislocations
3. Recurrent dislocations

3. Traumatic Disorders of Joints (Sports Injuries)

1. Ankle injuries
2. Knee injuries
3. Shoulder and elbow injuries
4. Wrist and hand injuries

4. Spinal trauma: diagnosis and management including various types of fixations

1. Rehabilitation of paraplegics/quadriplegics
2. Management of a paralyzed bladder
3. Prevention of bed sores and management of established bed sores
4. Exercise programme and Activities of Daily Living (ADL)
5. Psychosexual counseling



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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes					
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
MSC514A Traumatology and Rehabilitation	CO1	3	2	2	3	3	2	1	1	2	2
	CO 2	3	1	2	3	3	2	1	1	2	2
	CO 3	3	1	2	3	3	2	1	1	2	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution											

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Course Specifications MD Orthopedics

2022 onwards

Course Code: MSC515A



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Course Specifications

Course Title	Orthopaedic diseases
Course Code	MSC515A
Department	Orthopedics
Faculty	Surgery

Course Summary:

The course is designed in such a way that the student will master conditions of metabolic, degenerative, nutritional, congenital, developmental bone disorders.

Course Outcomes:

CO1: Demonstrate the application of principles of conservative/surgical therapy in the treatment of orthopedic diseases. (A,C,P)

CO2: Demonstrate comprehensive knowledge of regional and systemic orthopedic diseases. (A,C,P)

Course Content:**1. Poliomyelitis**

1. General considerations
2. Polio Lower limb and spine
3. Management of Post Polio Residual Palsy (PPRP)

2. Orthopedic Neurology

1. Cerebral Palsy
2. Myopathies

3. Peripheral Nerve Injuries

1. Traumatic
2. Entrapment Neuropathies

4. Bone Tumors

1. Benign bone tumors
2. Malignant bone tumors
3. Tumor like conditions
4. Metastatic bone Tumors

5. Miscellaneous Diseases

1. Diseases of muscles
2. Fibrous Dysplasia
3. Unclassified diseases of bone
4. Paget's disease
5. Peripheral vascular disease
6. Orthopaedic manifestations of bleeding disorders



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6. Regional Orthopaedic Conditions of Adults and Children

1. The spine
2. The shoulder
3. The elbow
4. The hand
5. The wrist
6. The hip
7. The knee
8. The foot and ankle
9. The pelvis

7. Pediatric orthopedics:

1. Fractures and dislocations in children
2. Perthes' disease
3. Slipped capital femoral epiphysis
4. Congenital Dislocation of Hip (CDH)
5. Neuromuscular disorders

8. Degenerative disorders of the spine

1. Prolapsed Inter Vertebral Disc (PIVD)
2. Lumbar Canal Stenosis (LCS)
3. Spondylolysis/Spondylolisthesis
4. Lumbar Spondylosis
5. Ankylosing Spondylitis
6. Spinal fusion: various types and their indications.



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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes					
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
MSC515A Orthopaedic diseases	CO 1	3	2	3	3	3	1	2	1	2	2
	CO 2	3	2	3	3	3	1	2	1	2	2
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution											



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M.S. Ramaiah Medical College and Hospital
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Course Specifications MD Orthopedics

2022 onwards

Course Code: MSC516A



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M.S. Ramaiah University of Applied Sciences
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M. L. Jayaraj
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Course Specifications

Course Title	General Surgery as applied to Orthopedics & recent advances.
Course Code	MSC516A
Department	Orthopedics
Faculty	Surgery

Course Summary:

The course is designed in such a way that the student will master recent developments in orthopedics and orthopedic subspecialties, principles of treating soft tissue injuries, wound healing and infections, neuro-vascular, chest, abdominal injuries associated with fractures

Course Outcomes:

CO 1: Apply newer advances in the comprehensive management of polytrauma. (C)

CO 2: Demonstrate comprehensive knowledge of polytrauma, MODS and its management. (C,A,P)

CO 3: Apply legal aspects with respect to road traffic accidents. (A,C)

Course Content:**1. Diagnostic Imaging in Orthopedics**

(Should know the interpretation and Clinical Correlation of the following): -

1. Digital Subtraction Angiography (DSA)
2. MRI and CT in Orthopedics
3. Musculoskeletal USG
4. PET Scan
5. Radio-isotope bone scan

2. Biomaterials

1. orthopedic metallurgy
2. Bio-degradable implants in Orthopedics
3. Bone substitutes
4. Bone Banking

3. Arthroplasty

1. Biomechanics of joints and replacement of the following joints.
2. Knee
3. Ankle
4. Shoulder
5. Elbow



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4. Minimally Invasive Surgery (MIS)**Arthroscopy**

1. General principles of Arthroscopy
2. Arthroscopy of knee and ankle
3. Arthroscopy of shoulder and elbow

5. Recent advances in orthopedics

1. Autologous chondrocyte implantation
2. Mosaicplasty
3. Video assisted Thoracoscopy (VATS)
4. Endoscopic spine surgery
5. Metal on metal arthroplasty of hip
6. Surface replacements of joints
7. Microsurgical techniques in Orthopedics
8. Designing a modern orthopedic operation theatre
9. Sterilization
10. Theatre Discipline
11. Laminar air flow
12. Modular OTs



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H. K. L. Rao

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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes					
		PO1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
MSC516A General Surgery as applied to Orthopedics & recent advances.	CO 1	3	2	3	3	3	2	2	2	3	2
	CO 2	3	2	3	3	3	2	2	2	3	2
	CO 3	1	3	1	1	1	1	3	3	1	1
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution											



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Course Specifications MS Orthopedics

2022 onwards

Course Code: MSP504A



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Course Specifications

Course Title	Dissertation
Course Code	MSP504A
Department	Orthopedics
Faculty	Surgery

Course Summary:

The course is designed in such a way that the student will master the science of research in terms of designing, conducting and interpreting the results.

Course Outcome:

Describe the techniques of research, identify available literature and critically analyze the same. (C)

Course details:

Every candidate pursuing MS Orthopedics degree course is required to carry out work on a selected research project under the guidance of a recognised post graduate teacher. The results of such a work shall be submitted in the form of a dissertation.

The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results and drawing conclusions.

Every candidate shall submit to the Registrar (Academic) of the University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within six months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.

Such synopsis will be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.

The dissertation should be written under the following headings:

1. Introduction
2. Aims or Objectives of study
3. Review of Literature
4. Material and Methods
5. Results
6. Discussion
7. Conclusion
8. Summary
9. References (Vancouver style)
10. Tables
11. Annexures



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Course Mapping (CO-PO-PSO Mapping)

Course Code and name	Course Outcomes	Program Outcomes				Program Specific Outcomes					
		PO 1	PO2	PO3	PO4	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
MSP504A Thesis Orthopedics	CO1	1	1	3	1	1	1	1	1	3	1
3: Very Strong Contribution, 2: Strong Contribution, 1: Moderate Contribution											



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Course Materials:**Books**

1. Campbell's Operative Orthopedics, Vols 1,2,3 &4
2. Mercer's Orthopaedic Surgery
3. Rockwood And Greens – Fractures In Adults, Vol 1&2
4. Fractures In Children – Rockwood &Wilkins
5. Physiological Basis Of Medical Practice – Best And Taylor's
6. Arthroscopic Surgery Of The Knee –Johannes
7. Concise System Of Orthopedics And Fractures – Graham Apley
8. Outline Of Fractures Adams, Hamblen
9. Textbook Of Orthopedics And Trauma – Kulkarni, Vol1to 4
10. B.D. Chaurasia's Human Anatomy, Vol1,Vol 2, Vol3
11. Pharmacology And Pharmacotherapeutics –Sathoskar
12. Orthopedics Anatomy And Surgical Approaches FrederickWreckling
13. The Art Of Aesthetic Plastic Surgery – John R Levis, Vol1
14. Current Concepts In Orthopedics - Dr. D. K.Tareja
15. Custom Mega Prosthesis & Limb Salvage Surgery Dr.Mayilvahanan
16. Advances In Operative Orthopedics
17. Green's Operative Hand Surgery-Vol. 1&. 2, Green, David P; Hotchkiss, Robert N
18. Tachdjian's Pediatric Orthopedics-Vol. 1, Vol 2, Vol 3, Herring, John Anthony
19. Surgical Exposures In Orthopedics: The Anatomic Approach, Hoppenfeld, Stanley; De Boer,Piet
20. Adams's Outline of Orthopedics, Hamblen, David L; Simpson, HamishR
21. Text Book Of Ilizarov Surgical Techniques Bone Correction And Lengthening, Golyakhovsky, Vladimir; Frankel, VictorH
22. Current Techniques In Total Knee Arthroplasty, Sawhney GS
23. Applied Orthopaedic Biomechanics, Dutta, Santosh;Datta,Debasis
24. Essential Orthopedics And Trauma, Dandy, David J; Edwards, DennisJ
25. Adams's Outlines Of Fractures; Including Joint Injuries, Hamblen, David L; Simpson, A Hamish RW
26. Orthopaedic Physical Assessment, Magee, David J
27. Turek's Textbook Of Orthopedics Vol 1 & 2,Turek's
28. Orthopedics Surgical Approach, Miller
29. AO Principles of Fracture Management, AO trauma
30. Clinical Orthopaedic Examination. Ronald McRae
31. Clinical Orthopaedic Diagnosis – Sureshwar Pandey
32. Chapman's Comprehensive Orthopaedic Surgery – Chapman and James 5 volumes
33. Instructional Course Lectures – AAOS
34. A Manual of Clinical Surgery – S Das



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Journals

- a. Journal of Bone and Joint Surgery
- b. Bone and joint Journal
- c. Journal of Orthopaedic Trauma
- d. Indian Journal of Orthopedics
- e. Orthopaedic Clinics of North America
- f. Clinical Orthopedics and Related Research
- g. Spine Journal

- h. Journal of Paediatric Orthopedics
- i. Journal of Arthroplasty
- j. Journal of Arthroscopy and Related Surgery
- k. Injury – International Journal for the care of the injured

Additional Reading

1. ICMR
2. UpToDate


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