REGULATIONS AND CURRICULUM GOVERNING

MS ORTHOPAEDICS PROGRAM

(2024-25)

Name of the Constituent Unit/Centre: Yenepoya Medical College



YENEPOYA

Deemed to be University

Deralakatte, Mangalore, Karnataka.

NOTIFICATION FROM THE UNIVERSITY

YENEPOYA
(DEEMED TO BE UNIVERSITY)
Recognized under Sec 3(A) of the UGC Act 1956
Accredited by NAAC with 'A' Grade

NOTIFICATION – 34-ACM/2019 dtd. 20.02.2019

Sub:- Implementation of Competency Based Medical Education PG Curriculum

Ref. : Resolution of the Academic Council at its 34th Meeting held on 08.02.2019 vide Agenda 33

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The Academic Council at its 34th Meeting held on 08.02.2019 and subsequently the 45th meetings of Board of Management held on 09.02.2019 have accepted the proposal for implementation of Competency Based Medical Education (CBME) for the PG Curricula of the following programs as per the MCI Norms.

1. MD in Pathology
2. MD in General Medicine
3. MD in Anaesthesiology
4. MD in Paediatrics
5. MD in Respiratory Medicine
6. MD in Radio-diagnosis
7. MD in Anatomy
8. MD in Physiology
9. MD in Biochemistry
10. MD in Microbiology
11. MD in Pharmacology
12. MD in Forensic Medicine
13. MD in Psychiatry
14. MD in Dermatology
15. MD in Community Medicine
16. MS in General Surgery
17. MS in OBG
18. MS in Otorhinolaryngology
19. MS in Ophthalmology
20. MS in Orthopaedics

This revised curriculum shall come into effect from the academic year 2019-2020 onwards.

REGISTRAR

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MS ORTHOPAEDICS

Preamble

Competency based training programme in Orthopaedics aims to create postgraduate student who, after undergoing the requisite training, should be able to serve the needs of the community and should be competent to solve the problems pertaining to the speciality of Orthopaedics and Trauma.

A postgraduate undergoing training MS in Orthopaedics should be trained to identify and recognize various congenital, developmental, inflammatory, infective, traumatic, metabolic, neuromuscular, degenerative and oncologic disorders of the musculoskeletal system. He/She should be able to provide competent professional services to trauma and orthopaedic patients at a primary/secondary/tertiary healthcare centres. The Postgraduate should acquire knowledge, skill and attitude to provide healthcare and education to the patients and students.

The purpose of this document is to provide teachers and learners illustrative guidelines to achieve defined outcomes through learning and assessment. This document was prepared by subject-content specialists. The Expert Group of the NMC had attempted to render uniformity without compromise to the purpose and content of the document. Compromise in purity of syntax has been made in order to preserve the purpose and content. This has necessitated retention of “domains of learning” under the heading “competencies”.

In order to achieve sustainable outcomes, certain competencies are essential to be achieved and assessed that will enable the qualified professional to perform the role in practice as an orthopaedic specialist. These roles would be to perform as a:

1. Clinical Expert
2. Professional
3. Scholar
4. Team Member
5. Researcher

Goals :

Goal: The goal of postgraduate medical education shall be to produce competent specialist and /or Medical teacher:

(i) 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;

(ii) 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:

(iii) who shall be aware of the contemporary advances and developments in the discipline concerned;

(iv) who shall have acquired a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology;

(v) who shall have acquired the basic skills in teaching of the medical and paramedical professionals.

SUBJECT SPECIFIC LEARNING OBJECTIVES /LEARNING OBJECTIVES

A postgraduate Student qualified for the MS (Ortho) examination should be able to do:

1. Aware of the current concepts in quality care in orthopaedics and musculo-skeletal trauma and also of diagnosis, therapeutic, medical or surgical management of various orthopaedic problems including trauma, infections, tumors, degenerative diseases, congenital and developmental disorders, metabolic diseases covering entire musuloskeletal system including spine.
2. Able to offer initial primary management of acute orthopaedic and trauma emergencies.
3. Aware of the limitations and refer readily to major centers for more qualified care of cases which warrant such referral.
4. Aware of research methodology and be able to conduct research and publish the work done.

5. Able to effectively communicate with patients, their family members, people and professional colleagues.
6. Able to exercise empathy and a caring attitude and maintain high ethical standards.
7. Continue to evince keen interest in continuing education irrespective of whether he/she is in a teaching institution or in clinical practice.
8. To be at the forefront of innovation by consistently up dating curriculum, course content and practices enabling the students to be competent and well versed in the respective field of study.
9. Provide use of cutting edge technology and resources available to ensure effective transaction of the course content.
10. To complement classroom learning with interactive learning systems and hands on learning by creating a collaborative Industry University Interface.
11. Provide freedom to continuously evaluate the evaluation systems and be at the forefront of innovation to enable and incorporate best practices.
12. To promote research in the frontier areas of the subject by encouraging the faculty and students by inculcating ethical principles in research.
13. To facilitate knowledge exchange by organizing seminars, symposia, workshops, lectures and other such activities.
14. To facilitate communication and collaboration with academia, industry and society.
15. To create advanced centres of research by developing state-of-the art facilities and meaningful collaborations.
16. To sensitize the students towards the social responsibilities by incorporating value education system.
17. To extend the university services to the community for building a healthy, empowered and sustainable society.
18. To build human resources and develop technologies to respond to the professional needs of the society.
19. To take up extension and outreach programs to serve the community.

SUBJECT SPECIFIC LEARNING OBJECTIVES

1. **Theoretical Knowledge:** A student should have fair knowledge of basic sciences (Anatomy, Physiology, Pathology, Biochemistry) as applied to Orthopaedics and be able to integrate such knowledge in his/her clinical practice. He/she should acquire in-depth knowledge of his subject including recent advances. He/she should be fully conversant with the bedside procedures (diagnostic and therapeutic) and having knowledge of latest diagnostics and therapeutics available.

2. **Clinical / Practical skills:** A student should be adapt at good history taking, physical examination, providing basic life support and advanced cardiac life support, common procedures like FNAC, Biopsy, aspiration from serous cavities, lumber puncture etc. He/she should be able to choose the required investigations appropriate for patient care , develop the attitude, communication skills, including dealing with patient's relatives with the required empathy, adapt to changing trends in education, learning methods and evolving new diagnostic and therapeutic techniques in the subject of Orthopaedics.

3. **Research:** He/she should know the basic concepts of research methodology, plan a research project, plan and write a thesis and should know how to use library facilities. Basic knowledge of statistics is also required. Knowledge about use of internet resources is required.

4. **Teaching:** The student should learn the basic methodology of teaching and assessment and develop competence in teaching medical/paramedical students and their assessment.

SUBJECT-SPECIFIC LEARNING COMPETENCIES

The postgraduate student should achieve competencies in three domains:

1 **Knowledge (Cognitive Domain)**

At the end of training, the student should be able to demonstrate ability to practically apply knowledge gained during training period. This would include the following:

1.1 Basic Sciences Applied to Orthopaedics

- Applied anatomy of musculoskeletal system
- Physiology of bone & cartilage

- Bone healing and fracture repair
- Biomechanics of joints and implants
- Pathology of musculoskeletal diseases
- Microbiology relevant to orthopaedics infection
- Pharmacology(NSAIDs, antibiotics, anti-TB drugs, biologics, osteoporosis drugs)
- Biomaterials & implant science, splints and orthrotics.

1.2 Trauma

- Principles of fracture management
- ATLS principles in polytrauma
- Open fracture management
- Compartment syndrome management
- Pelvic & acetabular fractures
- Spine trauma management

1.3 Adult Reconstruction

- Osteoarthritis & inflammatory arthritis
- Arthroplasty (Hip, Knee, Shoulder)
- Periprosthetic fractures
- Revision arthroplasty

1.4 Sports Medicine & Arthroscopy

- Ligament injuries
- Meniscal injuries
- Shoulder instability
- Cartilage restoration
- Tendon injuries

1.5 Spine Disorders

- Degenerative spine
- Spondylolisthesis
- TB spine

- Disc prolapse
- Spinal deformity

1.6 Paediatric Orthopaedics

- Developmental dysplasia of hip
- Clubfoot
- Perthes disease
- Slipped capital femoral epiphysis
- Cerebral palsy

1.7 Orthopaedic Oncology

- Benign & malignant bone tumors
- Metastatic bone disease

1.8 Infections

- Acute & chronic osteomyelitis
- Septic arthritis
- Musculoskeletal tuberculosis

1.9 Metabolic Bone Disorders

- Osteoporosis
- Rickets
- Osteomalacia
- Paget's disease

1.10 Physical Medicine & Rehabilitation

- Orthotics & prosthetics
- Post-operative rehabilitation
- Disability evaluation

2. **Attitude & Communication (Affective Domain)**

The student should:

1. The student will show integrity, accountability, respect, compassion and dedicated patient care. The student will demonstrate a commitment to excellence and continuous professional development.
2. student should Practice ethical orthopaedics, Communicate effectively with patients & relatives provides patient care, confidentiality of patient information, Take informed consent
3. The student should show sensitivity and responsiveness to patients' culture, age, gender and disabilities.
4. The student should know how to Work in multidisciplinary teams,Maintain medico-legal documentation, Follow biomedical waste protocols, Practice evidence-based medicine
5. Student should know Research & Academic activities
    - Design & conduct thesis
    - Critical appraisal of literature
    - Biostatistics basics
    - Present seminars & journal clubs
    - Publish research
    - Participate in CMEs & conferences
6. Student should have Teaching & Leadership qualities
    - Teach MBBS students
    - Train junior residents
    - Conduct clinical demonstrations
    - Organize academic activities
    - Lead OT team

3. **Skills (Psychomotor Domain)**

By the end of the training, a student should be able to demonstrate his skills in:

3.1 Clinical Skills

- Complete orthopaedic history & examination
- Trauma assessment
- Spine examination
- Pediatric orthopaedic examination
- Gait analysis

3.2 Diagnostic Skills

- Interpretation of X-rays,interpretation of scannogram
- CT, MRI interpretation
- Bone scan
- Basic ultrasound in orthopaedics
- Pre-operative planning

3.3 Surgical Skills

Basic Procedures

- Closed reduction & casting
- Skeletal traction
- External fixation
- Wound debridement

Fracture Fixation

- IM nailing
- Plating (DCP, LCP)
- Cannulated screws
- Tension band wiring

Arthroplasty

- Primary THR(assist)
- Primary TKR(assist)
- Management of complications

Arthroscopy

- Diagnostic knee arthroscopy
- Meniscectomy
- ACL reconstruction (assist/perform under supervision)

Spine

- Laminectomy (assist)

- Pedicle screw fixation (assist)

Paediatric

- Closed reduction DDH
- CTEV correction

3.4 Emergency Procedures

- Management of polytrauma
- Compartment syndrome fasciotomy
- Septic arthritis drainage

SYLLABUS

Course contents:

1. Basic Sciences

- Anatomy and function of joints
- Bone structure and function
- Growth factors and facture healing
- Cartilage structure and function
- Structure and function of muscles and tendons
- Tendon structure and function
- Metallurgy in Orthopaedics
- Stem Cells in Orthopaedic Surgery
- Gene Therapy in Orthopaedics

2. Diagnostic Imaging in Orthopaedics

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

- Digital Subtraction Angiography (DSA)
- MRI and CT in Orthopaedics
- Musculoskeletal USG
- PET Scan
- Radio-isotope bone scan

3. Metabolic Bone Diseases

- Rickets and Osteomalacia
- Osteoporosis
- Scurvy
- Mucopoly saccharoidoses
- Fluorosis
- Osteopetrosis

4. Endocrine Disorders

- Hyperparathyroidism
- Gigantism, Acromegaly

5. Bone and Joint Infections

- Pyogenic Haematogenous Osteomyelitis-Acute and Chronic
- Septic arthritis
- Fungal infections
- Miscellaneous infections
- Gonococcal arthritis
- Bone and joint brucellosis
- AIDS and the Orthopaedic Surgeon(universal precautions)
- Musculoskeletal Manifestations of AIDS
- Pott's spine
- Tubercular synovitis and arthritis of all major joints

6. Poliomyelitis

- General considerations
- Polio Lower limb and spine
- Management of Post Polio Residual Palsy(PPRP)

7. Orthopaedic Neurology

- Cerebral Palsy
- Myopathies

8. Peripheral Nerve Injuries

- Traumatic
- Entrapment Neuropathies

9. Diseases of Joints

- Osteoarthrosis
- Calcium Pyrophosphate Dihydrate (CPPD), Gout
- Collagen diseases

10. Systemic Complications in Orthopaedics

- Shock
- Crush syndrome
- Disseminated Intravascular Coagulation**(**DIC)
- Acute Respiratory Distress Syndrome (ARDS)

11. Bone Tumors

- Benign bone tumors
- Malignant bone tumors
- Tumor like conditions
- Metastatic bone Tumors

12. Miscellaneous Diseases

- Diseases of muscles
- Fibrous Dysplasia
- Unclassified diseases of bone
- Paget's disease
- Peripheral vascular disease
- Orthopaedic manifestations of bleeding disorders

13. Regional Orthopaedic Conditions of Adults and Children

- The spine
- The shoulder
- The elbow

- The hand
- The wrist
- The hip
- The knee
- The foot and ankle
- The pelvis

14. Biomaterials

- Orthopaedic metallurgy
- Bio-degradable implants in Orthopaedics
- Bone substitutes
- Bone Banking

15. Fracture and Fracture-Dislocations

General considerations

- Definitions, types, grades, patterns and complications
- Pathology of fractures and fracture healing
- Clinical and Radiological features of f ractures and dislocations
- General principles of fracture treatment
- Recent advances in internal fixation of fractures
- Locking plate osteosyntheses
- Less Invasive Stabilisation System (LISS)
- Ilizarov technique
- Bonegrafting and bonegraft substitutes
- Open fractures and soft tissue coverage in the lower extremity
- Compartment syndrome
- Fractures of the upper extremity and shoulder girdle
- Fractures of the lower extremity
- Fractures of the hip and pelvis
- Malunited fractures
- Delayed union and nonunion of fractures
- Fractures/dislocations and fracture-dislocations of spine

16. Dislocations and Subluxations

- Acute dislocations
- Old unreduced dislocations
- Recurrent dislocations

17. Traumatic Disorders of Joints (Sports Injuries)

- Ankle injuries
- Knee injuries
- Shoulder and elbow injuries
- Wrist and hand injuries

18. Arthrodesis

- Arthrodesis of lower extremity and hip
- Arthrodesis of upper extremity
- Arthrodesis of spine

19. Arthroplasty

- Biomechanics of joints and replacement of the following joints.
- Knee
- Ankle
- Shoulder
- Elbow

20. Minimally Invasive Surgery (MIS) Arthroscopy

- General principles of Arthroscopy
- Arthroscopy of knee and ankle
- Arthroscopy of shoulder and elbow

21.Amputations and Disarticulations

- Amputations and disarticulations in the lower limb
- Amputations and disarticulations in the upper limb

22.Rehabilitation -Prosthetics and Orthotics

23.Pediatric orthopaedics:

- Fractures and dislocations in children
- Perthes'disease
- Slipped capital femoral epiphysis
- Congenital Dislocation of Hip (CDH)
- Neuromuscular disorders

24. Spine

a) **Spinal trauma**: diagnosis and management including various types of fixations

i. Rehabilitation of paraplegics / quadriplegics
ii. Management of a paralyzed bladder
iii. Prevention of bedsores and management of established bedsores
iv. Exercise programme and Activities of Daily Living (ADL)
v. Psychosexual counselling

b) Degenerative disorders of the spine

i. Prolapsed Inter Vertebral Disc (PIVD)
ii. Lumbar Canal Stenosis (LCS)
iii. Spondylolysis / Spondylolisthesis
iv. Lumbar Spondylosis
v. Ankylosing Spondylitis
vi. Spinal fusion: various types and their indications.

25. Triage, Disaster Management, BTLS and ATLS

26. Recent advances in orthopaedics

- Autologous chondrocyte implantation
- Mosaicplasty
- Video assisted Thoracoscopy (VATS)
- Endoscopic spine surgery
- Surface replacements of joints

- Microsurgical techniques in Orthopaedics
- Designing a modern orthopaedic operation theatre
    - Sterilization
    - Theatre Discipline
    - Laminar airflow
    - Modular OTs

Essential theoretical knowledge

I. Basic Sciences

Anatomy:

i. Musculo skeletal anatomy – anatomy of the shoulder girdle, pelvic girdle, upper and lower limbs anatomy of the spine, Neurology of spinal cord.
ii. Embryology and development of musculoskeletal system.
iii. Histology.

Physiology:

i. Physiology musculoskeletal system.
ii. Metabolism of bone, hormonal influence on musculoskeletal system and other related orthopaedic physiology.
iii. Fluid / Electrolyte balance, Acid / base balance

Pathology:

i. General pathology.
ii. Tumour pathology in musculoskeletal system.
iii. Other orthopaedic pathology.

Biochemistry:

i. General Biochemistry.
ii. Biochemical aspects related to orthopaedic diseases.

Genetics in Orthopaedics

II. Clinical Orthopaedics

General Orthopaedics:

i. General principle of healing of injury and musculoskeletal trauma.
ii. Systematic management of the injured and body response to trauma.
iii. Head injury and fascio maxillary injury.
iv. General principle of management of Neurovascular injury.
v. Management of poly trauma, damage control orthopaedics..
vi. Consequences of musculoskeletal trauma and rehabilitation of the injured.
vii. General principal of management musculoskeletal trauma-surgical and conservative.
viii. Compound injuries – management and stabilisation procedures in orthopaedics.
ix. General principle of management musculoskeletal trauma – in children.

III. Orthopaedic Traumatology

i. Musculoskeletal trauma in shoulder girdle and upper limb.
ii. Musculoskeletal trauma in pelvic girdle and lower limb.
iii. Injuries of the spine and management of paraplegia.
iv. Pathological fractures and management.

IV. Diseases In Orthopaedics

i. Congenital malformations.
ii. Metabolic, developmental and hormonal disorders in musculoskeletal system.
iii. Epiphyseal and neuromuscular affections in children.
iv. Infective diseases in musculoskeletal system including polio and Leprosy.
v. Arthritis and Rheumatic disease.
vi. Tumours of musculoskeletal system.
vii. Amputations.
viii. Prosthetics and orthotics.
ix. Physical medicine.

V. Sports Medicine Including Arthroscopy

VI. Essential Diagnostic Skills - Instrumentation

Radiology:

a) General musculoskeletal radiology – plain X-ray.
b) MRI.
c) CT Scan.
d) Scintigraphy and Bone scan.
e) Stress radiography.
f) Ultrasonography

Interventional Radiography:

a) Sinogram
b) Myelography
c) Epidurogram
d) CT Guided biopsy
e) Arthrogram

VII. Surgical Skills

Anaesthesia

Regional anaesthesia

a) Wrist block and digital block
b) Femoral block
c) Ankle block
d) Brachial block and inter scalene block
e) Spinal anaesthesia
f) IVRA

VIII. Surgical Procedures

A. Pelvic girgle and lower limb

a) Fracture fixation.
b) Osteotomies and Arthrodesis in lower limb.
c) HRA in Hip joint.
d) Soft tissue surgeries.
e) Foot and ankle surgery.
f) Management of non union of fractures with illizarov.
g) Deformity correction with ilizarov.

h) Ligamentious reconstruction of knee joint.
i) Plastic reconstruction and other reconstructive procedures in musculoskeletal trauma.
j) Arthroscopic surgeries.
k) Total hip arthroplasty.
l) Total knee arthroplasty.
m) Total ankle arthroplasty.
n) Stabilisation of pelvic fracture by external fixator.
o) Acetabular fracture fixation and pelvic osteotomies.

B. Shoulder Girdle and Upper Limb

a) Fracture fixation, Osteotomies and Arthrodesis in upper limb.
b) Reconstructive surgeries in shoulder joint.
c) Soft tissue surgeries.
d) Elbow and Hand surgery.
e) Management of non-union of fractures with ilizarov.
f) Deformity correction with ilizarov.
g) Plastic reconstruction and other reconstructive procedures in musculoskeletal tumours.
h) Arthroscopic surgeries.
i) Total shoulder arthroplasty.
j) Total elbow arthroplasty.

C. Spine Surgeries

a) Posterior spinal fusion.
b) Disc surgery and decompressive procedures in spine.
c) Instrumentation in spine.
d) Endoscopic surgery in spine.
e) Deformity correction in spine.
f) Surgical procedures in TB Spine.

D. Surgical Procedures – Emergency

a) Primary wound debridement and External fixator application.

b) Emergency amputations.

c) Primary internal fixation for compound fractures.

IX. Research and Practice

a) Evidence based medicine.

b) Level of evidence.

c) Research methodology

d) Introduction to bioethics.

2.1 Graded responsibility in care of patients and operative work (Skill training)

All 3 years:

I. Emergency care at casualty as a member of team.

a) Triage.

b) Resuscitation of polytrauma patients

c) Splinting of fractures.

d) Stabilization of spine (splinting).

II. Patient evaluation and documentation, to order relevant investigations and make a treatment plan.

I YEAR

Trauma care

Closed reductions of fractures, Plaster application.

Debridement of open fractures, External fixations.

Internal fixations of minor fractures with K wire.

Non-traumatic conditions

Manipulative correction of congenital problems like CTEV

Biopsies

Excision of benign lesions.

Tendon lengthening.

II year

Trauma

Tension band wiring of fracture patella, fracture olecranon, etc

DCP of forearm bones, tibia, etc.

DHS

Non- traumatic conditions:

Carpal tunnel release

Bone grafting

Soft tissue release under supervision

III Year

Trauma

Hemi replacement arthroplasty of femur.

Dynamic condylar screw fixation

Interlocking nailing of long bone fractures

Non- traumatic conditions

Osteotomies

Soft tissue release

Tendon transfers

Basic arthroscopy (diagnostic)

Preparing discharge summary, able to present complicated cases in a meeting and discuss.

PRACTICAL TRAINING

A Junior Resident pursuing a P.G. degree course is expected to perform major and minor surgical procedures under the supervision of a Consultant. At the end of his 3 years training, he should be skilled to perform all the minor and common major surgical procedures.

DURATION OF TRAINING AND ROTATION

FIRST YEAR:-

- Learns Bed side history taking
- O.T. Exposure
- Casualty

- ICU
- Visit to related disciplines such as Physiotherapy Section, Anaesthesia, General Surgery etc.
- Look after the Ward / Indoor Patients and learn techniques of
  - Dressings
  - Traction
  - Splintage
  - Pre operative Preparation
  - Post operative Care etc
- Attends orthopaedic OPDs twice a week and helps in conducting the Outpatient.
- Attends routine O.Ts and emergency operations
- Assists ward rounds and visit other wards with senior colleagues to attend calls.
- Participates regular teaching programme of the department.
- Starts learning the basics in research methodology and prepares a thesis protocol in consultation with his Guide and Co-Guide, there by choosing his M.S. Orthopaedics– 'Thesis topic' to be passed by the departmental Board of Studies in due course.

SECOND YEAR & THIRD YEAR

- OPD–two days a week
- Discusses problematic cases with the Consultants in OPD / Ward.
- Attends O.T., 2-3 days a week. Assist in operations.
- Attends 2-3 Ward rounds per week.
- Care of the Indoor patients on beds allotted to him / her.
- Attends regular departmental Postgraduate training programme.
  - Presentation of emergencies.
  - X-Ray discussion.
  - Case Presentation.
  - Journal Club.
  - Seminar Presentation.
  - Trauma Meet, Ortho Radiology meet
  - Progress on thesis
  - Clinicopathological conference.
- Interdisciplinary lectures organised by the Departmental, Postgraduate Training Committee.

- Performs 24 hours emergency duty once/ twice a week as per the P.G. roster.
- Attends lectures / workshops
- Attends / participates / presents papers in the State / Zonal / National Conferences.
- Actively participates / helps in the organisation of the departmental workshops / courses in various specialised areas from time to time.
- Problem oriented record keeping including use of computer.
- Learns the techniques of medical literature search including the use of Internet.
- 6 monthly presentation of "Progression Thesis" to be presented in the department's Seminar room with the faculty members and residents present.

TEACHING AND LEARNING METHODS

Teaching methodology

Didactic lectures are of least importance; small group discussion such as seminars, journal clubs, symposia, thesis review ,interdepartmental meeting and guest lectures should get priority for theoretical knowledge. Bedside teaching, grand rounds, structured interactive group discussions and clinical demonstrations should be the hallmark of clinical/practical learning with appropriate emphasis on e-learning.

Student should have hands-on cadaveric training program, performing various procedures and ability to interpret various tests/investigations. Ability to observe, assisting, performed under supervision and he /she will be able perform independent surgery after finishing course

A candidate pursuing the course should work in the institution as a full time student. No Student should be permitted to run a clinic/laboratory/nursing home while studying postgraduate course. Each year should be taken as a unit for the purpose of calculating attendance.

Every student shall attend teaching and learning activities during each year as prescribed by the department and not absent himself / herself from work without valid reasons.

Rotations:

- A major portion of posting should be in Orthopaedics Department. It should include inpatients, out-patients, ICU, trauma, emergency room, specialty clinics including Fracture Clinic, CTEV Clinic, Spine Clinic, Hand Clinic, Arthroplasty Clinic, Arthroscopy Clinic, Sports Medicine Clinic, Paediatric Orthopaedic Clinic and Cadaveric dissection Lab.
- Inter-unit rotation in the department should be done for a period of up to one year.

A list of teaching and learning activities designed to facilitate students acquire essential knowledge and skills outlined is given below.

Participation in departmental teaching learning activities

1. Clinical rounds – bedside clinical discussion, treatment modalities, record maintenance, discussion of alternate methods of management, PG notes, etc.
2. Journal review meeting.
   Review of recent journals and presentation of the same in the departmental meetings. Should include indexed international and national journals. At least four presentations should be made my each candidate in each year of the course. Total of 12 journals/3 years
3. Seminars–on Muskuloskeletal trauma and diseases in Orthopaedics. Arthroplasty, spinal instrumentation and recent advances in orthopaedics. At least 4 seminars per year by each MS candidate – 12 Seminars for 3 years / seminars evaluated by check list
4. Should attend CPCs.
5. Interdepartmental meetings – Ortho radiology and Ortho pathology meetings should be attended by PGs.
6. Preparation and presentation of thesis work – should present to the department the review of literature in the first year and whole work by the second year to the department.
7. Case presentations: Minimum 48 cases / year presented by residents on rotation and will be assessed by check list.
8. Cadaveric surgical exposure dissection Basic Arthroscopy/Arthroplasty cadaveric demonstration needs to be done by every postgraduate.
9. Teaching skills : Postgraduate students must teach undergraduates and assessed by the faculty.
10. Continue Medical Education Programme (CME) recommended that atleast 4 State/National leve CME programmes should be attended by each student in 3 year.
11. Community camps **f**or rural exposure and also for experience in preventive aspect in rural situation/Hospital/School, patient care camps are to be arranged involving Residents junior faculty.
12. **Death Cases:** The records of such cases are presented by the Senior Residents. The Junior Residents are encouraged to participate actively in the discussion in the presence of Faculty of Orthopaedics and hospital administration. This programme helps to take corrective measures as well as to maintain accountability in patient management.

13. **Research Methodology**: The student should know the basic concepts of research methodology plan a research project, be able to retrieve information from the library. The student should have a basic knowledge of statistics. The resident shall compulsorily attend the research methodology workshop organized by the university. They can also do add on courses on ethics conducted by the university; however, it is optional.

    Note: The online Basic course in Biomedical Research conducted on SWAYAM portal is mandatory as per the NMC notification.

14. **Dissertation:**

    1. **Selection of Thesis Topic:** Selection of the thesis will be selected by the candidate towards the end of 6 months under the guidance of Faculty. A protocol will be prepared for consideration by the departmental Board of Studies and the University.
    2. **Approval of the Thesis Topic:** The Board of Studies of the department will consider the thesis topic. The constraints and the ethical aspects will be discussed and only then the subject/topic will be passed. This will be again reconsidered at the Scientific Review Board and Ethics Committee of the college.
    3. **Research Work:-**Once the thesis protocol is approved, the candidate starts his research work under the direct supervision of his/her guide/co-guide.
    4. **Progression Thesis:-** Six monthly progress of the thesis to be presented by the candidate (power point presentation) in the department's Seminar Room with the Department's Faculty members and residents present, to know the outcome/ difficulties faced by the candidate. Just before the submission of the thesis a final presentation will also be carried out by the candidate.
    5. **Submission of Thesis:-**The candidate is required to submit the thesis, 6 months before the final M.S. Orthopaedics Examination. At the discretion of the Dean, Faculty of Medicine, one month extension may be granted to a candidate for the submission of his/her thesis, for any valid reason for the delay.

    Every candidate pursuing MS degree course is required to carry out work on a selected research project under the guidance of a recognized 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:

i. Introduction
ii. Aims of Objectives of study.
iii. Review of Literature.
iv. Material and Methods.
v. Results.
vi. Discussion.
vii. Conclusion.
viii. Summary
ix. References
x. Tables
xi. Annexures

The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexures. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27” x 11.69”) and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the Institution.

Complete the dissertation work 6 months before the University examination on or before the dates notified by the University. Four copies of dissertation thus prepared along with CD shall be submitted to the Registrar (Evaluation), six months before final examination.

The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is an essential precondition for a candidate to appear in the University examination.

A post-graduate student of a degree course in broad specialty/super specialty will do at least one of the following to make him/her eligible to appear in his/her final examination:

a. Poster presentation at a National/Zonal/State conference of his/her speciality

b. Podium presentation at a National/Zonal/State conference of his/her speciality

c. Have one research paper published/accepted for publication in journal of his/her Speciality as first author

d. E-learning activities are to be encouraged.

POSTING UNDER "DISTRICT RESIDENCY PROGRAMME" (DRP):

1) Complete DRP posting in the second year. DRP log book to be maintained.

- All postgraduate students pursuing shall undergo a compulsory rotation of three months in District Hospitals/District Health System as a part of the course curriculum, as per the Postgraduate Medical Education (Amendment) Regulations (2020). Such rotation shall take place in the 3rd or 4th or 5th semester of the Postgraduate programme and the rotation shall be termed as "District Residency Programme" and the PG medical student undergoing training shall be termed as "District Resident". Postgraduate student should compulsorily maintain a DRP log book. DRP posting completion certificate is essential for a postgraduate student for eligibility to write the final University examination. He/she should do 24 hours stay duty on rotation. It is permitted to avail 5 days of permitted leave in three months posting.

  Every posting should have its defined learning objectives. It is recommended that the departments draw up objectives and guidelines for every posting offered in conjunction with the collaborating department/s or unit/s. This will ensure that students acquire expected competencies and are not considered as an additional helping hand for the department / unit in which they are posted. The PG student must be tagged along with those of other relevant departments for bedside case discussion/basic science exercises as needed, under the guidance of an assigned faculty.

  Opportunities to present and discuss infectious disease cases through bedside discussion and ward/grand rounds with specialists / clinicians in different hospital settings must be scheduled to address antimicrobial resistance issues and strategies to deal with it.

E LOG BOOK:

1) The e-log book is a record of the important activities of the candidates during his training, internal assessment should be based on the evaluation of the log book. Collectively, e-log books are a tool for the evaluation of the training programme of the institution by external agencies. The record includes academic activities as well as the presentations and procedures carried out by the candidate and are to be updated weekly and supervised by the guide.

2) Each post graduate student should maintain a log book and record his/her participation in the training programmes conducted by the department such as case presentations, journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate. Log book to be assessed monthly by Unit chief / Senior faculty and critical comments to be provided for improvement. Logbook should also contain a section on progress of thesis with a student documenting his progress and work to be done in next phase, and obtain feedback from guide. This should be done once in 6 months.
3) Each student must be asked to present a specified number of cases for clinical discussion, perform procedures/tests/operations/present seminars/review articles from various journals in inter-unit/interdepartmental teaching sessions. They should be entered in a e- Log Book. The e-Log books shall be checked and assessed periodically by the faculty members imparting the training.

Amendments made to Teaching Learning Methods: Role play/interactive lectures, movies to give training in patient counselling, informed consent process, empathy and communication skills

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 surgical skills laboratories in the medical colleges is mandatory.

LEAVES: In addition to 20 days permitted annual leave, the PG residents are eligible to take additional leave to attend state / national level conferences for presenting poster / paper. In addition to this, five days of additional leave will be sanctioned for attending local meeting/ conferences /

workshops. Leave for medical illness and special occasions like self-marriage, maternity leave will not be counted for attendance.

ATTENDANCE: Every Postgraduate student is required to attend a minimum of 80% of the training each academic year of the Postgraduate 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.

4) *Each post graduate student should maintain 80% attendance in all 3 years of PG course,* means he/she will work for 939 days in three years excluding leaves and week offs.
5) Each Postgraduate can avail 20 days paid casual leave per year and 5 days of academic leave per year.
6) Weekly one day off (subject to exigencies of work)

ASSESSMENT

FORMATIVE ASSESSMENT

Current plan the department is following for formative assessment over the training duration.

List the current assessment plan in each of the following:

1) Theory:-
    a) As part of internal assessment – one per year
    b) Monthly theory examination: 1 per month for final year postgraduates c) Seminar presentation – 3 per month with formative assessment
    d) Journal club: One per month with formative assessment
2) Clinical:-
    a) Case presentation and formative assessment- One per week b) OSCE : Started from 2024 for final year Postgraduates
3) Thesis: 6 monthly assessment an review by department
4) Log Book: Monthly review and formative assessment by Unit heads
5) Internal assessment – Every year Theory and clinical

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.

General Principles:

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

1) The Internal Assessment should be conducted in theory and clinical examination.
2) Quarterly assessment during the MS training should be based on following educational activities:
    1. Case based discussions-Once a week
    2. Seminar presentations-Once a week
    3. Journal Club-Once a month
    4. Ortho Radiology meet-Once in 2 months
    5. Ortho Pathology meet-Once in 6 months
    6. External and Outreach Activities (attending camps / CMEs)
    7. Basic Research Methodology workshops

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

Monitoring Learning Progress:

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves. The monitoring be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using checklists that assess various aspects. Checklists are given in Chapter IV.

The learning outcomes to be assessed should included:

(i) Personal Attitudes: The essential items are:

- Caring attitudes.
- Initiative.
- Organisational ability.
- Potential to cope with stressful situations and undertake responsibility.
- Trust worthiness and reliability.

- To understand and communicate intelligibly with patients and others.
- To behave in a manner which establishes professional relationships with patients and colleagues.
- Ability to work in team.
- A critical enquiring approach to the acquisition of knowledge.

The methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

(ii) Acquisition of Knowledge: The methods used comprise of 'Log Book' which records of participation in various teaching / learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The log book should periodically be validated by the supervisors. Some of the activities are listed. The list is not complete. Institutions may include additional activities, if so, desired.

Journal Review Meeting (Journal Club): The ability to do literature search, in depth study, presentation skills, and use of audio-visual aids are to be assessed. The assessment is made by faculty members and peers attending the meeting using a checklist (model checklist – I, in Chapter IV)

Seminars / symposia: The topics should be assigned to the student well in advance to facilitate in depth study. The ability to do literature search, in depth study, presentation skills and use of audio-visual aids are to be assessed using a checklist (see Model Checklist – II, Chapter IV)

Clinico- Pathological conferences :

This should be a multidisciplinary case study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenter(s) are to be assessed using a check list similar to that used to seminar.

Surgical Audit: Periodic morbidity and mortality meeting be held. Attendance and participation in these must be insisted upon. This may not be included in assessment.

(iii) Clinical Operative skills:

Day to Day work: Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates sincerity and punctuality, analytical ability and communication skills (see Model Checklist III, Chapter IV)

Clinical meetings: Candidates should periodically present cases to his peers and faculty members. This should be assessed using a check list (see Model Checklist IV, Chapter IV)

Clinical and Operative skills: The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the log book. (Table No. 3, Chapter IV)

(iv) Teaching skills:

Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students.

(v)Dissertation in the Department :

Periodic presentations are to be made in the department. Initially the topic selected is to be presented before submission to the University for registration, again before finalisation for critical evaluation and another before final submission of the completed work.

(vi) Periodic tests:

The departments may conduct three test, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practicals / clinical, osce and viva voce.

(vii) Work diary / e-Log Book :

Every candidate shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate. Log book to be assessed monthly by Unit chief / Senior faculty and critical comments to be provided for improvement. Logbook should also contain a section on progress of thesis with a student documenting his progress and work to be done in next phase, and obtain feedback from guide. This should be done once in 6 months.

(viii) Record:

Records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI.

SUMMATIVE ASSESSMENT i.e., assessment at the end of the training

Essential pre-requisites for appearing for examination include:

The student to be assessed periodically as per categories listed in the student appraisal form (Annexure I).

1. **Log book** of work done during the training period including rotation postings, departmental presentations, and internal assessment reports should be submitted.
2. At least **two presentations** at national level conference. One research paper should be published / accepted in an indexed journal**. (It is suggested that the local or University Review committee assess the work sent for publication).**

The summative examination would be carried out as per the Rules given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. The theory examination shall be held in advance before the Clinical and Practical examination, so that the answer books can be assessed and evaluated before the commencement of the clinical/Practical and Oral examination**.**

The postgraduate examination shall be in three parts**:**

1. Thesis

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student in broad specialty shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the

Thesis by the examiners**.**

2. Theory examination

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, as given in the latest POSTGRADUATE MEDICAL EDUCATION REGULATIONS. 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 M.D./ M.S shall be held at the end of 3rd academic year.

There shall be four theory papers (as per PG Regulations).

Paper I: Basic sciences as applied to the subject
Paper II: Traumatology and Rehabilitation
Paper III: Orthopaedic diseases
Paper IV: Recent advances in Orthopaedic surgery & General Surgery as applied to Orhopaedics

3. Practical/clinical and Oral/viva voce examination

Practical examination

Practical examination should be spread over **two** days and include various major components of the syllabus focusing mainly on the psychomotor domain.

Oral/Viva voce examination on defined areas should be conducted by each examiner separately. Oral examination shall be comprehensive enough to test the post graduate student's overall knowledge of the subject focusing on psychomotor and affective domain. It should include:

- Stations for clinical, procedural and communication skills
- Log Book Records and reports of day-to-day observation during the training
- Should test the post graduate student's overall knowledge of the subject in:

- Ortho Radiology
- Ortho Pathology
- Histopathology & Gross anatomy
- Instruments
- Orthotics and Prosthotics

Summative Assessment at the end of the training

1. **Thesis**

Every post graduate student shall carry out work on an assigned research project under the guidance of a recognized Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis. Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the candidate to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The dissertation shall be valued by External examiner outside the state at the time of the final Practical/Clinical examination. Viva voce will be taken on it and marks will be given on quality of dissertation/thesis and performance on its viva voce.

Scheme of Examination

A. Theory:

There shall be four question papers, each of three hours duration. Each paper shall consist of two long essay questions each question carrying 20 marks and 6 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. Details of distribution of topics for each paper will be as follows:

Paper I - Basic sciences as applied to Orthopaedics

Paper II - Traumatology and Rehabilitation.

Paper III - Orthopaedics Diseases

Paper IV- Recent Advances in Orthopaedic Surgery and General Surgery applied to Orthopaedics

Clinical Examination/ Practical and viva:-

a. The clinical and practical examination is conducted as per the NMC and University Guidelines.
b. One long case: The long case will be structured, comprising – history taking, clinical examination, investigations, decision making, proposed treatment modalities, ethical justification and personal attributes.
c. Two short cases: The short cases will also be structured in which only one particular system may be considered and therapy decision /discussion made.

Practical examination - Viva:-

Identification of Surgical Pathology, excised specimens & discussion, reading X-rays & CT Scan / MRI, identification of Instruments & discussion, identification of prosthetic and Orthotics and discussion there on.

B. **Clinical:** 300 Marks

There shall be one long case and two short cases to be examined and presented by each candidate and OSCE 4 stations of 40 marks. Total Clinical Marks shall be 300.

C. **Viva Voce :** 100 Marks

1) Viva- voce Examination : (100 Marks)

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 slides, instruments, X-rays, ultrasound, CT scan images, etc., interpretation. It includes discussion on dissertation also.

2) Dissertation: (20 Marks)

Scheme of Examinations: (As per PGMER December 2023)

SL NO	THEORY PAPER	Max. Marks
Paper 1	Basic sciences as applied to Orthopaedics	100
Paper 2	Traumatology and Rehabilitation	100

Paper 3	Orthopaedics Diseases	100
Paper 4	Recent Advances in Orthopaedic Surgery and General Surgery applied to Orthopaedics	100
Total Marks		**400 marks**

PRACTICAL CLINICAL	**MARKS ALLOTED-300**
Long case 1	120
Short case 1	60
Short case 2	60
OSCE	40 (Minimum 4 stations and two should be manned stations)
Dissertation	20
Total	**300**
VIVA VOCE	**MARKS ALLOTED-100**
X-rays	25
Instruments	25
Prosthetics and Orthotics	25
Osteology	25
Total	**100**
Grand total (Clinical+viva voce)	**400**

Assessment Pattern for Final PG Internal Assessment and University Examination of MS Course

Criteria for Evaluation of MS Course

CRITERIA FOR EVALUATION OF M.S. COURSE

1. THEORY

No. of Theory Papers 4

Marks for each Theory Paper 100

Total marks for Theory Paper 400

Passing Minimum for Theory 200/400 (40% minimum in each paper)

2. PRACTICAL/CLINICAL 300 marks

3 VIVA VOCE 100 marks

Passing minimum for Practical/Clinical including Viva voce 200/400

The candidate shall secure not less than 50% marks in each head of passing which shall include

(1) Theory – aggregate 50% (In addition, in each Theory paper a candidate has to secure minimum of 40%)

(2) Practical/Clinical and Viva voce - aggregate 50%

(3) If any candidate fails even under one head, he/she has to re-appear for both Theory and Practical/Clinical and Viva voce examination.

(4) Five per cent of mark of total marks of Clinical/Practical and Viva Voce marks (20 marks) will be of dissertation/thesis and it will be part of clinical/practical examination marks. External examiner outside the state will evaluate dissertation/ thesis and take viva voce on it and marks will be given on quality of dissertation/thesis and performance on its viva voce.

(5) No grace mark is permitted in post-graduate examination either for theory or for practical.

Examiners/ Final Examinations

A) There shall be four examiners including two external and two internal.

a. The examiner (both internal and external) for the post-graduate examination in Broad and Super Specialties shall have three years' experience as recognised Post-graduate Guide in the concerned subject.

b. The minimum number of examiners for post-graduate examination shall be four. Out of which, at least two shall be external examiners and least one of them shall be from different university outside the state.

c. An examiner shall not be appointed for more than two consecutive regular examinations for the same institution.

B). All examiners shall be jointly responsible for the examination.

Distribution of marks for Theory examination

Item	**Marks**
No. of Theory Papers	4
Marks for each Theory Paper	100
Total marks for Theory Paper	**400**
Passing Minimum for Theory	200/400 (40% minimum in each paper) Theory – aggregate 50% (In addition, in each Theory paper a candidate has to secure minimum of 40%)

Distribution of marks for Practical examination- Clinical departments

Item	**Marks**	**Total Marks**
Long case	1*120	120
Short case	2*60	120
OSCE (Minimum 4 stations and two should be manned stations)	40	40
Dissertation viva	20	20
Subtotal of clinical/practical	300	**300**
Viva voce	100	100
Grand total	400	**400**

Practical/Clinical and Viva voce - aggregate 50%

Recommended Reading:

1. Campbell's Operative Orthopaedics, Vols 1, 2, 3 & 4 Campbell's Operative Orthopaedics, 4-Volume Set, 14th Edition by Frederick M Azar, MD, S. Terry Canale, MD and James H. Beaty, MD

2. Mercer's Orthopaedic Surgery Vol. 1 & 2, Author(s) : Robert B Duthie Edition: Nineth, Year of Publication: 2003

3. Rockwood And Greens – Fractures in Adults, Vol 1& 2 Rockwood and Green's Fractures in Adults Author(s): Paul Tornetta , William Ricci MD, FAAOS, Charles M. Court-Brown MD, FRCS Ed (Orth), Margaret M. McQueen MD, Michael McKee MD, FRCS (C)Publication Date: March 27, 2019

4. Fractures in Children – Rockwood & Wilkins - Rockwood and Wilkins Fractures in Children Edition: 9. Author(s): Peter M Waters MD, David L. Skaggs MD, John M. Flynn. Publication Date: March 19, 2019

5. Paediatric Orthopaedics – Tachidjian, Vol 4 Tachdjian's Pediatric Orthopaedics: From the Texas Scottish Rite Hospital for Children, 6th edition - November 27, 2020 Author: John Herring

6. Concise System Of Orthopaedics And Fractures – Graham Apley Apley's Concise System of Orthopaedics and Fractures Louis Solomon, David Warwick, Selvadurai Nayagam CRC Press, 31-Mar-2005

7. Textbook of Orthopaedics and Trauma – Kulkarni, Vol 1 Textbook of Orthopedics and Trauma (4 Volumes) GS Kulkarni, Sushrut Babhulkar, Publish Year 2016

8. B.D. Chaurasia's Human Anatomy, Vol1,Vol 2, Vol 3 B D Chaurasia's Handbook of Anatomy English Editions 2022 Eighth Editions Volume 2 (paperpack, CHAURASIAS), Author: CHAURASIAS, Publisher: CBS Publishers, Publishing Date 2022

9. Pharmacology and Pharmacotherapeutics – Satoskar- Pharmacology and Pharmacotherapeutics, 24th Edition - June 30, 2015, Authors: RS Satoskar, Nirmala Rege, SD Bhandarkar

10. Orthopaedics Anatomy and Surgical Approaches Frederick Wreckling Orthopaedic Anatomy and Surgical Approaches Edited by Frederick W. Reckling, Jo Anne B.

Reckling and Melvyn P. Mohn, S. P. Frostick, First Published August 1, 1991

11. Green's Operative Hand Surgery-Vol. 1&. 2, Green, David P; Hotchkiss, Robert N Green's Operative Hand Surgery, 2-Volume Set 7th Edition - February 24, 2016, Authors: Scott W. Wolfe, William C. Pederson, Scott H. Kozin, Mark S. Cohen
12. Surgical Exposures in Orthopedics: The Anatomic Approach, Hoppenfeld, Stanley; De Boer, Piet Surgical Exposures in Orthopaedics: The Anatomic Approach, Edition: 6, Author(s): Piet de Boer MD, Richard Buckley MD, FRCSC, Stanley Hoppenfeld MD, Publication Date: October 7, 2021
13. Text Book of Ilizarov Surgical Techniques Bone Correction And Lengthening, Golyakhovsky, Vladimir; Frankel, Victor H Textbook of Ilizarov Surgical Techniques: Bone Correction and Lengthening by Vladimir Golyakhovsky, Victor H Frankel, Publishing Year 2010
14. Applied Orthopaedic Biomechanics, Dutta, Santosh; Datta, Debasis Applied Orthopaedic Biomechanics, by Debasis Datta Santosh K Dutta Publisher :B.I.Publications, Year 2008.

Journals

03-05 international Journals and 02 national (all indexed) journals.

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Blueprint for the four theory papers (Content weightage paper-wise) for summative (university) exam for MS in Orthopaedics

Blue printing for Orthopedics

Sl. No.	Discipline	Topics	Weightage	Marks allotted	No. of Questions
1	**Orthopaedics Paper I:** Basic Sciences as applied to orthopaedics	Anatomy of musculoskeletal system	20%	20	2
		Embryology, development of musculoskeletal system and congenital disorders	20%	20	2
		Metabolism and metabolic bone disorders	20%	20	2
		General principles of orthopedic surgery including surgical techniques, approaches, amputations, arthrodesis arthroplasty etc.	20%	20	2
		Bone tumours	20%	20	2
		Total	**100%**	**100**	**10**
2	**Orthopaedics Paper II:**Traumatology and Rehabilitation	Upper limb trauma	20%	20	2
		Lower limb trauma	20%	20	2
		Spine and pelvic	20%	20	2
		Pediatric age group (ensure that region does not overlap with above)	20%	20	2
		Neglected trauma/complications	20%	20	2
		Total	**100%**	**100**	**10**
3	**Orthopaedics Paper III:**Orthopaedics diseases	Infective disorders	20%	20	2
		Inflammatory pathologies	10%	10	1
		Disorders of spine	10%	10	1
		Regional conditions of lower limb	20%	20	2
		Regional conditions of upper limb.	20%	20	2
		Degenerative conditions and	20%	20	2

		miscellaneous disorders			
		Total	**100%**	**100**	**10**
4	**Orthopaedics Paper IV:** Recent Advances in Orthopaedic Surgery + General Surgery as applied to Orthopaedics	Management of patients on surgery, general surgical principles, post operative management, infection control measures	20%	20	2
		Newer advances in orthopedic implants	20%	20	2
		Artificial intelligence, imaging advances	20%	20	2
		Newer surgical techniques	20%	20	2
		Newer advances in wound healing, bone graft substitutes, miscellaneous	20%	20	2
		Total	**100%**	**100**	**10**

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Model question papers (All four papers)**:** MS (orthopedics) final examinations.

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M.S. DEGREE EXAMINATION

ORTHOPAEDICS

Paper I: Basic Sciences as applied to Orthopaedics

QP Code: 6029

Your answers should be specific to the questions asked.

Draw neat labelled diagrams wherever necessary

Answer all questions.

Short Essays (10x10=100 marks)

1. Describe the factors affecting calcium metabolism in humans.
2. Discuss principles of surgical techniques for amputation.
3. Enumerate the layers of growth plate with a neat diagram.
4. Define gait, explain different phases of gait, describe the features of Trendlenburg gait.
5. Describe the principles behind tendon transfer
6. Describe the deformities of hand in case of Rheumatoid arthritis.
7. What are the stages of tubercular arthritis involving large joints. Briefly describe management options based on stage.
8. What is biofilm, describe the stages of biofilm and methods to overcome biofilm.
9. Describe anatomy of brachial plexus with a neat diagram.
10. Limb salvage surgeries.

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YENEPOYA (DEEMED TO BE UNIVERSITY)

M.S. DEGREE EXAMINATION

ORTHOPAEDICS

Paper II: Traumatology and Rehabilitation

QP Code: 6030

Your answers should be specific to the questions asked.

Draw neat labelled diagrams wherever necessary

Answer all questions.

Short Essays (10x10=100 marks)

1. A 28 year old male presents with fracture neck of femur non union, Describe the management strategies, complications and outcomes.
2. Classify tibial condyle fractures and management plan as per the classification
3. Management of soft tissue defects in open fractures of tibia
4. Differentiate between upper and lower motor nerve injuries in a spine fracture with neurological involvement.
5. Classify sacral fractures, describe the complications of sacral fractures
6. What are the clinical features of acute compartment syndrome of forearm and management options.
7. Describe various treatment options and outcome for a 4 part proximal humeral fracture in a 35 year old young patient.
8. Myositis ossificans
9. Distal radioulnar subluxation.
10. Damage control orthopedics.

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M.S. DEGREE EXAMINATION

ORTHOPAEDICS

Paper III: Orthopaedics diseases

QP Code: 6031

Your answers should be specific to the questions asked.

Draw neat labelled diagrams wherever necessary

Answer all questions.

Short Essays (10x10=100 marks)

1. What are head at risk signs in perthes disease, how do you classify the stages of perthes disease.
2. Describe management options for an unstable slipped capital femoral epiphysis
3. Osteochondritis dissecans
4. How do you manage a case of GCT lower end of radius.
5. Describe indications, contraindications, limitations and complications of shoulder replacement.
6. Cold abscess
7. Classify meniscal tears and discuss treatment options
8. Classify pseudoarthrosis of tibia and management options.
9. Congenital radioulnar synostosis
10. Manifestations of Hansen's disease.

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M.S. DEGREE EXAMINATION

ORTHOPAEDICS

Paper IV: Recent Advances in Orthopaedic Surgery +

General Surgery as applied to Orthopaedics

QP Code: 6032

Your answers should be specific to the questions asked.

Draw neat labelled diagrams wherever necessary

Answer all questions.

Short Essays (10x10=100 marks)

1. Bioabsorbable implants
2. Use of AI in orthopedics
3. Bone graft substitutes.
4. Ceramic prosthesis in orthopedics
5. Antibiotic beeds
6. Endoscopic discectomy
7. Hyponatremia in a patient with hip fracture
8. Multilock interlocking nail for proximal humerus fractures
9. Robotic assisted surgeries in orthopedics
10. Guidelines for telemedicine.

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Annexure 1

Student appraisal form for MS in Orthopaedics											
	Element	**Less than Satisfactory**			**Satisfactory**			**More than satisfactory**			**Comments**
		1	2	3	4	5	6	7	8	9	
1	**Scholastic Aptitude and Learning**										
1.1	Has Knowledge appropriate for level of training										
1.2	Participation and contribution to learning activity (e.g., Journal Club, Seminars, CME etc.)										
1.3	Conduct of research and other scholarly activity assigned (e.g Posters, publications etc.)										
1.4	Documentation of acquisition of competence (eg. Log book)										
1.5	Performance in work based assessments										
1.6	Self- directed Learning										
2	**Care of the patient**										
2.1	Ability to provide patient care appropriate to level of training										
2.2	Ability to work with other members of the health care team										
2.3	Ability to communicate appropriately and empathetically with patients families and care										
2.4	Ability to do procedures appropriate for the level of training and assigned role										
2.5	Ability to record and document work accurately and appropriate for level of training										

2.6	Participation and contribution to health care quality improvement										
3	**Professional attributes**										
3.1	Responsibility and accountability										
3.2	Contribution to growth of learning of the team										
3.3	Conduct that is ethical appropriate and respectful at all times										
4	**Space for additional comments**										
5	**Disposition**										
	Has this assessment been discussed with the trainee?	Yes	No								
	If not explain										
	Name and Signature of the assesse										
	Name and Signature of the assessor										
	Date										

Checklist for Research Article	
Title	
Authors/Affiliation	
Was the purpose stated clearly? Yes / No	Outline the purpose of the study. How does the study apply to your research question/clinical practice?
Was relevant background literature reviewed? Yes / No	Describe the justification of the need for this study.
Design:	Describe the study design. Was the design

RCT cohort single case design before and after case-control cross-sectional case study	appropriate for the study question?
Was the sample described in detail? Yes / No	Sampling (who; characteristics; how many; how was sampling done?) If more than one group, was there similarity between the groups?
Was the purpose stated clearly? Yes / No	
Was relevant background literature reviewed? Yes / No	
Design: RCT cohort single case design before and after case-control cross-sectional case study	
Was the sample described in detail? Yes / No	
Intervention was described in detail? Yes / No	Short description of the intervention.

Not addressed	
Were the outcome measures reliable? Yes / No Not addressed	Describe the outcomes and their reliability and applicability?
Applicability	Are the inclusions, Interventions and outcomes relevant/applicable to your setting?
Results were reported in terms of statistical significance? Yes No N/A Not addressed	What were the results? Were they statistically significant (i.e., $p < 0.05$)? If not statistically significant, was study big enough to show an important difference if it should occur?
Clinical importance was reported? Yes No Not addressed	What was the clinical importance of the results? Were differences between groups clinically meaningful?
Conclusions were appropriate given study methods and results Yes No	What did the study conclude? What are the implications of these results for practice? What were the main limitations or biases in the study?
Conclusion	

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Format of Model Check Lists

SHORT CASE EVALUATION FORM

Name of presenter:

Date of presentation:

Name of evaluator:

Case difficulty: easy/medium/tough

Final diagnosis:

Differential diagnosis provided	Unsatisfactory	Satisfactory	Good
Able to explain differential diagnosis based on findings which are appropriate			
Proposed investigations			
Treatment plan suggested.			

General comments on attitude, ability to identify the learning needs etc. Signature of the evaluator:

Student performance: Very poor/poor/satisfactory/good/very good

Chapter IV

Check List – I.

MODEL CHECK-LIST FOR EVALUATION OF JOURNAL REVIEW PRESENTATIONS

Name of the Student: Date:

Name of the Faculty / Observer:

Sl No.	Items for observation during presentation	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Article chosen was					
2.	Extent of understanding of scope & objectives of the paper by the candidate					
3.	Whether cross references have been consulted					
4.	Whether other relevant publications					

	consulted					
5.	Ability to respond to questions on the paper / subject					
6.	Audio-Visual aids used					
7.	Ability to defend the paper					
8.	Clarity of presentation					
9.	Any other observation					
	Total Score					

Check List – II

MODEL CHECK-LIST FOR EVALUATION OF SEMINAR PRESENTATIONS / JOURNAL CLUB

Name of the Student: Date:

Name of the Faculty / Observer:

SI No.	Items for observation during presentation	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Whether other relevant publications consulted					
2.	Whether cross references have been consulted					
3.	Completeness of Preparation / Article chose was					
4.	Clarity of Presentation / Audibility / Proficiency in language					
5.	Understanding of subject / knowledge in the subject					
6.	Ability to answer questions / interaction					
7.	Time scheduling / attitude / body language					
8.	Appropriate use of Audio-visual aids					
9.	Overall Performance					
	Total Score					

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CHECK LIST – III

MODEL CHECK LIST FOR EVALUATION OF CLINICAL WORK IN WARD / OPD

(To be completed once a month by respective Unit Heads)

Name of the Student: Date:

Name of the unit Head:

Sl. No.	Points to be considered	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Regularity of attendance					
2.	Punctuality					
3.	Interaction with colleagues and supportive staff					
4.	Maintenance of case records					
5.	Presentation of cases during rounds					
6.	Investigations work up					
7.	Beside manners					
8.	Rapport with patients					
9.	OT work					
	Post-op & follow-up					
10.	Overall quality of Ward work					
	Total Score					

CHECK LIST – IV

EVALUATION FORM FOR CLINICAL PRESENTATION

Name of the Student: Date:

Name of the Faculty:

Case Presented :

Sl. No.	Points to be considered	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Completeness of history with all relevant points elicited					
2.	Clarity of Presentation / Audibility					
3.	Mentioned all positive and negative points					

	of importance					
4.	Accuracy of general physical / local examination					
5.	Diagnosis Whether it follows logically from history and findings					
6.	Approach to the management, investigations & step by step discussion of treatment with application of logic & relevance					
7.	Proficiency of language & knowledge of the subject					
	Grand Total					

CHECK LIST – VI

EVALUATION FORM FOR CASE BASED DISCUSSION

Name of the Student: Date:

Name of the Faculty:

Case Complexity: Low / Moderate / High

Basis for Discussion: Out patient record / In patient record / Discharge summary / other

If others- Specify:

Brief description of case including curricula areas covered:

Sl. No.	Points to be considered	Well below expectation	Below expectation	Borderline expectation	Meets expectation	Above Expectation	Well above Expectation	Unable to comment
1.	Medical Record Keeping							
2.	Clinical Assessment							
3.	Investigations and referrals							
4.	Management plan							
5.	Follow up and future planning							
6.	Overall clinical judgement							
	Grand Total							

Which aspects of the encounter were done well? :

Any suggested areas for development:

Agreed action:

Postgraduate Students Appraisal Form

Pre / Para / Clinical Disciplines

Name of the Department/Unit:

Name of the PG Student:

Period of Training: FROM……TO…….

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications: Yes/ No

Remarks*_____

*REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.

Signature of Assessor Signature of Consultant Signature of HOD

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LOG BOOK

CERTIFICATE

Name of postgraduate:

Year of postgraduate:

This is to certify that this portfolio is maintained by Dr. ……. postgraduate, Department of orthopaedics during his/her post graduation from ……..to ……
During this period his/her involvement in work was satisfactory and he/ she has participated actively in all activities of Orthopaedic department including hands on experience in managing patients with Orthopaedic ailments. A brief summary of competencies developed are included in the end of this book.

Signature of postgraduate:

Signature of Unit Chief : Name : Signature :

1st Unit :

2nd Unit:

3rd Unit:

SIGNATURE OF HOD :

DETAILS OF POSTING:

DEPARTMENT	TIME PERIOD
ORTHOPAEDICS (YMCH) UNIT WISE	
DISTRICT RESIDENCY POSTING	

SEMINAR PRESENTATION

Sr. No./	Date	Topic	REFLECTIONS	COMMENTS OF THE MODERATOR
1				
2				
3				
4				
5				

CASE PRESENTATION

Sr.No.	Date	Case Details	Reflection (What was learned and points to read)	Evaluation and feedback

JOURNAL CLUB

Sr.No	Date	Article Details	Reflection (what is learned and points to read	Feedback

GRAND ROUNDS

Sr.No	Date	Case Details	Discussion

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EMERGENCY CASE EVALUATION IN CASUALTY

Sr.No	Date	Case Details	Reflection

PROCEDURE PERFORMED- OBSERVED (O) ASSISTED (A) PERFORMED UNDER SUPERVISION (PS) PERFORMED INDEPENDENTLY (PI)

Sr.No.	Date	Procedure	Case Details

SURGICAL CASE PARTICIPATION

Sr.No	Date	Procedure with Case Details	Observed	Assisted	Performed

SKILL LAB AND CADAVERIC LAB PARTICIPATION

Sr.No	Date	PROCEDURE	Reflections (what is learned and points to read)

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CME/WORKSHOP/CONFERENCE/GUEST LECTURES (Attended)

From Date	To date	Name of CME/Workshop/Conference/Guest lectures (State/National/International)	Signature of Faculty

PODIUM PRESENTATIONS IN CONFERENCE S

SL.No.	Date	TITLE	CONFERENCE / PLACE

PUBLICATION

Sr.No./ Date	TITLE	JOURNAL

GROUP DISCUSSIONS

Sl. No	Date	Topic	Signature of

FACULTY LECTURES

Sl. No	Month & Year	Topic	Signature of Faculty

CLINICOPATHOLOGICAL CONFERENCES

Sl. No	Month &	Case discussed	Signature of

CLINICORADIOLOGICAL CONFERENCES

Sl. No	Month & Year	Case discussed	Signature of Faculty

PROGRAM OBJECTIVE ASSESSMENT

	Teaching/ Learning Method	Assessment Method	Result
PO1			
PO2			
PO3			
PO4			
PO5			
PO6			
PO7			

MONTHLY REFLECTION: (3 Years course period from the date of joining to end of the course)

MONTH: **YEAR:**

Progress report (6 monthly)

Activity	Status
Log book entry completed with reflections (to be completed every month and signed by mentor)	
Research methodology workshop completed (certificate to be attached)	
Number of seminars presented with details	
Number of case presentations with details	
Number of journal club presented with details	
Any other teaching activity attended including conference presentations	
Selection of research topic with finalization of protocol and ethics approval	
Short study selected	

Signature of postgraduate Name: Signature of mentor: Name:

Date : Date: