Program and Course Structure

School of Medical Science and Research

MS (Orthopedic)
Session: 2021-24
Program Code: SMS1801

B. Program Structure Template

1. Standard Structure of the Program at University Level

1.1 Vision, Mission and Core Values of the University

Vision of the University

To serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship.

Mission of the University

1. Transformative educational experience
2. Enrichment by educational initiatives that encourage global outlook
3. Develop research, support disruptive innovations and accelerate entrepreneurship
4. Seeking beyond boundaries

Creative Campaign Can be TEDs: This is guiding principle for promotion and wide circulation among various stakeholder.
Guidelines: Similar Mnemonics can be designed by schools.

Core Values

- Integrity
- Leadership
- Diversity
- Community

Note: Detailed Mission Statements of University can be used for developing Mission Statements of Schools/ Departments.

1.2 Vision and Mission of the School

Vision of the School

To serve the society by being a premier institute that promotes a comprehensive approach to human health through excellence inacademics, research and clinical care

Mission of the School

- Provide a transformative educational experience in Medical Science
- Develop skills and competencies to create global leaders in clinical care
- Promote innovative and collaborative research through intellectual and technological advancement
- Establish a center for excellence in preventive, promotive and curative health care

1.3 Program Educational Objectives (PEO)

1.3.1 Writing Program Educational Objectives (PEO)

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Program educational Objectives

A post graduate student upon successfully qualifying in the MS(Orthopaedics) examination should be able to:

1. PEO1:to identify and recognize various congenital, developmental, inflammatory, infective, traumatic, metabolic, neuromuscular, degenerative and oncologic disorders of the musculoskeletal systems.
2. PEO2: She/he should be able to provide competent professional services to trauma and orthopaedic patients at a primary/ secondary/tertiary healthcare centres.
3. PEO3: update knowledge in recent advances and newer techniques in the management of the patients and participate regularly in departmental academic activities by presenting Seminar, Case discussion, Journal Club and Topic discussion on weekly basis and maintain logbook.
4. PEO4: know the basic concepts of research methodology, plan a research project and know how to consult library and should have basic knowledge of statistics.
5. PEO5:earn the basic methodology of teaching and develop competence in teaching medical/paramedical students.

6. PEO6: acquire the requisite attitude and communication skills to deal with patients in a humane manner

1.3.2 Map PEOs with Mission Statements:

PEO Statements	**Mission 1** Provide a transformative educational experience in Medical Science	**Mission 2** Develop skills and competencies to create global leaders in clinical care	**Mission 3** Promote innovative and collaborative research through intellectual and technological advancement	**Mission 4** Establish a center for excellence in preventive, promotive and curative health care
PEO1: diagnose and appropriately manage common surgical ailments in a given situation. to identify and recognize various congenital, developmental, inflammatory, infective, traumatic, metabolic, neuromuscular, degenerative and oncologic disorders of the musculoskeletal systems.	**3**	**3**	**3**	**3**
PEO2. She/he should be able to provide competent professional services to trauma and orthopaedic patients at a primary/ secondary/tertiary healthcare centres.	**3**	**3**	**3**	**3**
PEO3. update knowledge in recent advances and newer techniques in the management of the patients and participate regularly in	**3**	**3**	**3**	**2**

departmental academic activities by presenting Seminar, Case discussion, Journal Club and Topic discussion on weekly basis and maintain logbook.				
PE04: know the basic concepts of research methodology, plan a research project and know how to consult library and should have basic knowledge of statistics.	**1**	**1**	**3**	**3**
PEO5: Acquire skills in learn the basic methodology of teaching and develop competence in teaching medical students.	**3**	**2**	**3**	**2**
PEO6: acquire the requisite attitude and communication skills to eal with patients in a humane manner	**2**	**1**	**3**	**3**

Enter correlation levels 1, 2, or 3 as defined below:

1. Slight (Low) 2. Moderate (Medium) 3. Substantial (High)

If there is no correlation, put "-"

1.3.2 Program Outcomes (PO's)

1. Cognitive Domain

At the end of the course, the student should have acquired knowledge in the following theoretical competencies:

PO1: Demonstrate sufficient understanding of the basic sciences relevant to orthopedic specialty through a problem-based approach.

PO2: Describe the Principles of injury, its mechanism and mode, its clinical presentation, plan and interpret the appropriate investigations, and institute the management of Musculo skeletal injured patient.

PO3: 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.

PO4: Describe the principles of internal and external fixation for stabilization of bone and joint injuries.

PO5: Describe the pharmacokinetics and dynamics of drug metabolism and excretion of analgesics, anti-inflammatory, antibiotics, disease modifying agents and chemotherapeutic agents.

PO6: Identify a problem, prepare a research protocol, conduct a study, record observations, analyse data, interpret the results, discuss and disseminate the findings.

PO7: Describe social, economic, environmental, biological and emotional determinants of health in a given patient with a musculoskeletal problem.

B Affective domain

At the end of the course, the student should have acquired knowledge in the following theoretical competencies

PO8: 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.

PO9: 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.

PO10: 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.

C**. Psychomotor Domain**

The student should be able to perform independently the following:

PO11: Provide pre and post OP care

PO12: Perform all clinical skills as related to the specialty.

At the end of the program, the student should have acquired following competencies (PSOs):

1.3.4 Mapping of Program Outcome Vs Program Educational Objectives

	PEO1	PEO2	PEO3	PEO4	PEO5	PEO6
PO1	3	3	3	1	3	1
PO2	3	3	3	1	3	1
PO3	3	3	3	1	3	1
PO4	3	3	3	1	3	1
PO5	3	3	3	1	3	1
PO6	3	3	3	3	3	1
PO7	3	3	3	-	3	1
PO8	-	-	-	-	3	1
PO9	-	-	-	-	3	1
PO10	-	-	-	-	3	3
PO11	3	3	3	-	3	3
PO12	3	3	3	-	3	3

Syllabus

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 - Mucopolysaccharoidoses - 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 Tumours - Benign bone tumours - Malignant bone tumours - Tumour like conditions - Metastatic bone Tumours
12. Miscellaneous Diseases - Diseases of muscles - Fibrous Dysplasia - Unclassified diseases of bone - Paget's disease 8 - 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 fractures and dislocations ♣ General principles of fracture treatment ♣ Recent advances in internal fixation of fractures ♣ Locking plate osteosyntheses ♣ Less Invasive Stabilisation System (LISS) ♣ Ilizarov technique ♣ Bone grafting and bone graft 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 non union of fractures ♣ Fractures/dislocations and fracture - dislocations of spine
16. Dislocations and Subluxations - Acute dislocations - Old unreduced dislocations 9 - 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 bed sores and management of established bed sores 10 iv. Exercise programme and Activities of

Daily Living (ADL) v. Psychosexual counseling 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 - Metal on metal arthroplasty of hip - Surface replacements of joints - Microsurgical techniques in Orthopaedics - Designing a modern orthopaedic operation theatre - Sterilization - Theatre Discipline - Laminar air flow - Modular OTs

ASSESSMENT FORMATIVE ASSESSMENT, i.e., assessment during the training

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. The Internal Assessment should be conducted in theory and practical/clinical examination.

Quarterly assessment during the MD programme should be based on:

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

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

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

The summative examination would be carried out as per the Rules given in POSTGRADUATE MEDICAL EDUCATION REGULATIONS, 2000.

The post-graduate examinations should be in three parts:

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 26 post graduate student 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 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 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. 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./ MS shall be held at the end of 3rd academic year. An academic term shall mean six month's training period.

There should be four theory papers:

Paper I: Basic Sciences as applied to Orthopaedics
Paper II: Traumatology and Rehabilitation
Paper III: Orthopaedic diseases
Paper IV: Recent advances in Orthopaedic surgery + General Surgery as applied to Orthopaedics

3. **Clinical/Practical and Oral/viva voce Examination**

The practical examination should consist of the following and should be spread over two days, if the number of post graduate students appearing is more than five.

1. One long case: History taking, physical examination, interpretation of clinical findings, differential diagnosis, investigations, prognosis and management.
2. Short cases from various sections of the speciality (three)

4. **Oral/Viva-Voce Examination**

- Surgical Anatomy including Osteology
- Instruments
- Radiology –
- Surgical Pathology –
- Orthotics and prosthetics

Recommended Reading:

Books (Latest edition)

1. Campbell's Operative Orthopaedics, Vols 1,2,3 & 4
2. Mercer's Orthopaedic Surgery
3. Rockwood And Greens – Fractures In Adults, Vol 1& 2
4. ractures In Children – Rockwood & Wilkins
5. Physiological Basis Of Medical Practice – Best And Taylor's

6. Arthroscopic Surgery Of The Knee – Johannes

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

Annexure I

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 /				
6	CMEs				
7	Thesis / Research work				
8	Log Book Maintenance				

Publications **Yes/ No**

Remarks*_____

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_____ _____ *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 ASSESSEE SIGNATURE OF CONSULTANT SIGNATURE OF HOD