Service Truth Wisdom

MS (Orthopaedic Surgery)

CURRICULUM

University Residency Program

Rawalpindi Medical University

RMU

PREFACE

The horizons of ***Medical Education*** are widening & there has been a steady rise of global interest in *Post Graduate Medical Education*, an increased awareness of the necessity for experience in education skills for all healthcare professionals and the need for some formal recognition of postgraduate training in Internal Medicine.

We are seeing a rise in the uptake of places on postgraduate courses in medical education, more

frequent issues of medical education journals and the further development of e-journals and other new online resources. There is therefore a need to provide active support in *Post Graduate Medical Education* for a larger, national group of colleagues in all specialties and at all stages of their personal professional development. If we were to formulate a statement of intent to explain the purpose of this logbook, we might simply say that our aim is to help clinical colleagues to teach and to help students to learn in a better and advanced way. This book is a **state-of-the-art** logbook with representation of all activities of the **MD/MS Research Elective** program at RMU.A summary of the curriculum is incorporated in the logbook for convenience of supervisors and residents. It also allows the clinicians to gain an understanding of what goes into basic science discoveries and drug development. Translational **research** has an **important role** to play in **medical research**, and when used alongside basic science will lead to increased knowledge, discovery and treatment in **medicine**. A perfect monitoring system of a training program including monitoring of teaching and learning strategies, assessment and Research Activities cannot be denied so we at RMU have incorporated evaluation by ***Quality Assurance Cell*** and its comments in the logbook in addition to evaluation by ***University Training Monitoring Cell (URTMC)***. Reflection of the supervisor in each and every section of the logbook has been made sure to ensure transparency in the training program. The mission of Rawalpindi Medical University is to improve the health of the communities, and we serve through education, biomedical research and health care. As an integral part of this mission, the importance of research culture and establishment of a comprehensive research structure and research curriculum for the residents has been formulated and a separate journal for research publications of residents is available.

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TABLE OF CONTENTS

S. No.	Title	Page's
Section I	**Preamble**	**04**
1	**Introduction**	**04**
2	**Mission Statement** 2.1) RMU mission statement 2.2) orthopedic mission statement	**05**
3	**Rules and regulations**	**06**
4	**General framework of MS orthopedics** 4.1) Recognized training centers and supervisors. 4.2) duration of program.	**07**
5	**Objectives**	**09**
6	**Core Competencies**	**11**
7	**Rotations**	**15**
8	**Teaching strategies**	**16**
9	**Assessment Guidelines**	**19**
Section II	**Course Contents**	**23**
1	**Syllabus of the FTA**	**23**
2	**Syllabus of MTA**	**29**
Section III	**Research Framework**	**31**
1	**Submission of synopsis**	**31**
2	**Submission of thesis**	**32**
3	**E Log Book**	**32**
Section IV	**Workshops**	**51**
Section V	**Life Cycle of MS Orthopedics**	**56**
1	**Milestones to be Achieved by Trainees** **1.1 EPAs of Orthopedic Surgery in RMU.** **1.2 TOS of 1st year (General Surgery)**	**56**
Section VI	**Assessment strategies** 1.1 **Framework of MTA, FTA, Thesis defense.** 1.2 **Table of specification in orthopedics** 1.3 **Table of specification unit wise.** 1.4 **Topic wise distribution of OSCE stations.**	**61**
Section VII	**Logbook**	**83**
Section VIII	**Portfolio**	**84**
Section IX	**References**	**85**
Section X	**Appendices**	**86**

SECTION I PREAMBLE

1 INTRODUCTION

The MS Orthopedics program is a five (5) years course which will cover all aspect of Orthopedics. The curriculum provides the approved framework for the training of doctors to the level of independent, consultant orthopedic practices, according to needs and requirements of orthopedic patients, general public and health services.

2 Mission Statement

2.1 RMU Mission Statement:

To impart evidence based research oriented health professional education in order to provide best possible patient care and inculcate the values of mutual respect, ethical practice of healthcare and social accountability.

Motto

2.2 Mission Statement of Orthopedics:

To provide exceptional education and training to develop highly skilled, knowledgeable, research oriented and compassionate orthopedic surgeons.

3 Rules & Regulations

3.1 REGISTRATION/ENROLMENT

- As per policy of Pakistan Medical & Dental Council, the number of PG Trainees/ Students per supervisor shall be maximum O5 per annum for all PG programs.
- The beds to trainee ratio at the approved teaching site shall be at least 5 beds per trainee.
- The University will approve supervisors for MS courses.
- Candidates selected for the courses: after their enrollment at the relevant institutions shall be registered with RMU as per prescribed Registration Regulations.

3.2 ADMISSION CRITERIA

For admission in MS Orthopedics course, the candidate shall have:

- MBBS degree
- Completed one-year House Job
- Registration with PMDC
- Passed Entry Test conducted by the University & aptitude interview by the Institute concerned
- Having up to the mark credentials as per RMU rules (no. of attempts in each professional, any gold medals or distinctions, relevant work experience, Rural/ Army services, research experience in a recognized institution, any research article published in a National or International Journal) may also be considered on case to case basis.

Exemptions: A candidate holding FCPS/MRCS/Diplomat/equivalent qualification in Orthopedic Surgery shall be exempted from Part-I Examination and shall be directly admitted to Part-II Examinations, subject to fulfillment of requirements for the examination.

4) GENERAL FRAMEWORK OF MS ORTHOPEDICS CURRICULUM

MS Orthopedics will be a 5-year program. Those candidates who will complete their training and other requirements will be awarded an MS (Orthopedics) degree by the Rawalpindi Medical University.

Table 1: Framework of MS Orthopedics

Training Year	*Module Name*	*Duration*	*Assessment*	*Research*
1st	*General Surgery*	*10 Months*	*General Surgery assessment*	*One Disease Statistical Review*
1st	*Plastic Surgery (Minor rotation)*	*01 rotation of 02 months*		
2nd	*Orthopedics*	*12 months*	*MTA*	*One Research Paper in R-JRM*
3rd	*Orthopedics*	*12 months*	*In training assessment 3rd year*	*Synopsis Topic& Submission to IRF/ ERB - BASR Approval*
4th	*Orthopedics*	*12 months*		*Data Collection / Data Analysis / Thesis Writing*
5th	*Rotations* *1. Neuro-Spine (Compulsory)* *2. Pediatric Orthopedics* *3. Arthroplasty* *4. Arthroscopy and Sports* *5.Hand Surgery*	*During 3 years Training in Orthopedics, 03 rotations of 03 Months each:*		*Thesis Completion Certification (DME) / BASR - Thesis Approval*
			FTA	*Thesis Submission*

MTA: Mid-term assessment **FTA**: Full-term assessment **IRB:** Internal review board

ERB: Ethical review board **BASR:** Board of advance study and research

4.1 RECOGNIZED TRAINING CENTERS AND SUPERVISORS

Three hospitals attached with Rawalpindi Medical University (RMU) and Allied Teaching Hospitals will start with MS program, i.e.

- Department of Orthopedic Surgery (Benazir Bhutto Hospital, Rawalpindi)
- Department of Orthopedic Surgery (Holy Family Hospital, Rawalpindi)
- Department of Orthopedic Surgery (Rawalpindi Teaching Hospital, Rawalpindi)

Teaching faculty with five or more than five years teaching experience in a PMDC recognized teaching hospital will be eligible to act as supervisors for MS program.

4.2 Duration of Program.

The duration of MS Orthopedic course shall be five (5) years. First Year will be in General Surgery with Compulsory Rotation of 02 Months of Plastic Surgery. Next 04 Years in Orthopedics with One Year of Elective Rotations with structured training in a recognized department under the guidance of an approved supervisor.

The course is structured in two parts:

MTA is structured for the 1st and 2nd calendar years in MS Orthopedics. The candidate shall undertake clinical training in fundamental concepts of Surgery & Orthopedics. At the end of 2nd year, examination shall be held in fundamental concepts of Surgery & Orthopaedics.by the end of first year the resident must write one disease statistical review (DSR).

FTA is structured for 3rd, 4th and 5th calendar years in MS Orthopedics. It has two components: Clinical and Research. The candidate shall undergo clinical training to achieve educational objectives of MS Orthopedic (knowledge, skills & Attitude) along with rotation in relevant fields.

The clinical training shall be competency based. There shall be generic and specialty specific competencies and shall be assessed by continuous clinical Assessment and work place based assessment including DOPS, CBD and Mini CEx.

Research Component and thesis writing shall be completed over five years' duration of the course. Candidates will spend total time equivalent to one calendar year for research during the training. Research can be done as one block, or it can be done in the form of regular periodic rotation over four years if total research time is equivalent to one calendar year.

5) Objectives:

5.1) MS(ORTHOPEDICS) PROGRAM

- This course is designed to produce specialist in Orthopedic and trauma surgery, who will have adequate knowledge and skills in Orthopedic & Trauma surgery and can recognize to deal safely with a wide range of Orthopedic and Trauma problems as consultants.

5.2) GENERAL LEARNING OBJECTIVES

The goal of MS course in Orthopedics is to produce a competent Orthopedic surgeon who is:

- Aware of the current concepts in quality care in Orthopedics and musculoskeletal trauma and also of diagnosis, therapeutic, medical and surgical management of Orthopedic problems
- Able to offer initial primary management of acute Orthopedic and trauma emergencies
- Aware of the limitations and refer readily to major centers for more qualified care of cases which warrant such referral
- Aware of research methodology and be able to conduct research and publish the work done
- Able to effectively communicate with patients, their family members, people and professional colleagues
- Able to exercise empathy and a caring attitude and maintain high ethical standards
- Able to continue taking keen interest in continuing education irrespective of whether he / she is in teaching institution or in clinical practice
- Dynamic, available at all times and proactive in the management of trauma victims and Orthopedic emergencies

5.3) SPECIFIC LEARNING OBJECTIVES

At the end of MS course, the resident should be adept in the following domains:

- Skill to take a proper history for musculoskeletal disorders
- Clinical examination of all musculoskeletal disorders
- Application of history & clinical findings in making an appropriate clinical diagnosis
- Interpretation of investigations
- Discussion of options of treatment and follow up rehabilitation for the diagnosis made
- Have an in-depth theoretical knowledge of the syllabus with emphasis on current concepts
- Learn basic skills in musculoskeletal surgery including training on bone models and on patients by assisting or performing under supervision or perform independently as required.
- Have basic knowledge of common disorders of the spine, degenerative disorders of spine, trauma spine and infections of spine for diagnosis and evaluation of the common spine disorders
- Develop a familiarity to major topics under “Sports Medicine” - to gain exposure to the basic surgery, master the patho-physiology of the conditions usually encountered and develop a sound foundation to add new knowledge in the future
- Learn basic principles of Hand Surgery with emphasis on applied anatomy, understanding patho-physiology of common conditions, planning of treatment and post-operative protocols
- Develop understanding of principles of soft tissue coverage and learn basic techniques used in extremity surgery.

6 CORE COMPETENCIES

The curriculum MS Orthopedic Surgery of Rawalpindi Medical University, Rawalpindi is derived from **Accreditation Council for Graduate. Medical Education (ACGME)** which is competency / performance-based system competencies.

1. **Medical Knowledge** **20%**
2. **Patient Care** **20%**
3. **Interpersonal & Communication Skills** **20%**
4. **Professionalism** **20%**
5. **Practice Based Learning** **5%**
6. **System Based Learning** **5%**
7. **Research** **10%**

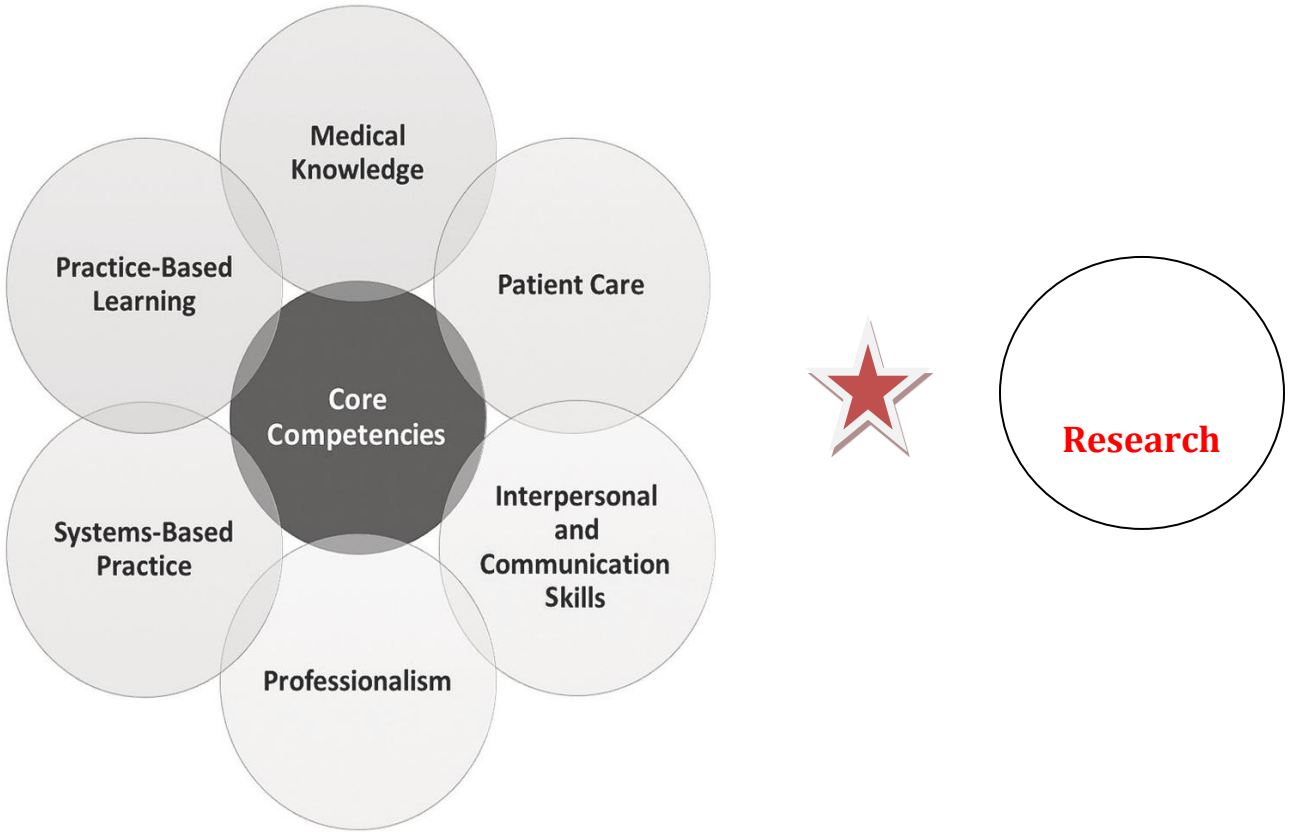


FIGURE 1: Core Competencies of MS Orthopedics

Medical Knowledge

- Demonstrate a thorough understanding of biomedical, clinical, and cognate sciences and apply this knowledge to patient care.

Patient Care

- Residents are expected to provide patient care compassionately, effectively for the promotion of health, prevention of illness, treatment of disease and end of life decisions.
- Gather accurate, essential information from all sources, including interviews, physical examinations, medical records, and diagnostic/therapeutic procedures.
- Make informed recommendations about preventive, diagnostic and therapeutic options, interventions based on clinical judgment, scientific evidence, and patient preference.
- Develop, negotiate, and implement effective patient management plans and integration of patient care.
- Perform competently the diagnostic and therapeutic procedures considered essential to the practice of general surgery.

Interpersonal and Communication Skills

- Residents are expected to demonstrate interpersonal communication skills that enable them to establish and maintain professional relationships with patients, families, and other members of health care teams.
- Provide effective and professional consultation to other physicians and health care professionals to deal with ethically professional relationships with patients, their families, and colleagues.
- Use effective listening, nonverbal, questioning, narrative skills to communicate with patients and families.
- Interact with consultants in a respectful, appropriate manner.
- Maintain comprehensive, timely, and legible medical records.

Professionalism

- Residents are expected to demonstrate behaviors that reflect a commitment to continuous professional developmental, ethical practice, an understanding and sensitivity to diversity and a responsible attitude toward their patients, their profession, and society.
- Demonstrate respect, compassion, integrity, and altruism in relationships with patients, families, and colleagues.
- Demonstrate sensitivity and responsiveness to the gender, age, culture, religion, sexual preference, socioeconomic status, beliefs, behavior and disabilities of patients and professional colleagues.
- Adhere to principles of confidentiality, scientific/academic integrity, and informed consent.
- Recognize and identify deficiencies in peer performance.
- Understand and demonstrate the skill and art of end-of-life care.

Practice-Based Learning and Improvement

- Residents are expected to be able to use scientific evidence, methods to investigate, evaluate, and improve patient care prac'tices.
- Identify areas for improvement and implement strategies to enhance knowledge, skills, attitudes, and processes of care.
- Analyze and evaluate practice experiences and implement strategies to continually improve the quality of patient practice.
- Develop and maintain a willingness to learn from errors and use errors to improve the system or processes of care.
- Use information of technology or other available methodologies to access and manage information, support patient care decisions, and enhance both patient and physician education.
- Develop error prevention skills and critical thinking leading to prevention of cognitive dispositions to respond.

Systems-Based Practice

- Residents are expected to demonstrate both an understanding of the contexts and systems in which health care is provided, and the ability to apply this knowledge to improve and optimize health care.
- Understands accesses and utilizes the resources, providers, and systems necessary to provide optimal care.
- Understand the limitations and opportunities inherent in various practice types and delivery systems and develop strategies to optimize care for the individual patient.
- Apply evidence-based, cost-conscious strategies to prevention, diagnosis, and disease management.
- Collaborate with other members of the health care team to assist patients in dealing effectively with complex systems and to improve systematic processes of care.

7 ROTATIONS

MODULAR SYSTEM

The 5-year MS (Orthopedics) training will comprise of:

First year in General surgery (including plastic surgery rotation) and next 04 years in Orthopedic Surgery.

Training Year	Module Name	Duration
1st	**General Surgery**	10 Months
1st	**Plastic Surgery (Minor rotation)**	01 rotation of 02 months
2nd	**Orthopedics**	12 months
3rd	**Orthopedics**	12 months
4th	**Orthopedics**	12 months
5th	**Rotations** **1. Neuro-Spine (Compulsory)** **2. Pediatric Orthopedics** **3. Arthroplasty** **4. Arthroscopy and Sports** **5. Hand Surgery**	During 3 years Training in Orthopedics, 03 rotations of 03 Months each:

- Credit hours will be awarded to the candidates after they have attended and cleared the Internal assessment of each module.

- MS (Orthopedics) will comprise of 03 exams; one at the end of 1st year (conducted by the General Surgery Department), then at the end of 2nd year of training (MTA) and then on completion of 5th year of training (FTA).

8 TEACHING STRATEGIES

8.1) TEACHING PROGRAM IN GENERAL SURGERY

1. General Principles

- Acquisition of practical competencies being the keystone of postgraduate medical education, postgraduate training is skills oriented.
- Learning in postgraduate program is essentially self-directed and primarily emanating from clinical and academic work. The formal sessions are merely meant to supplement this core effort.

Inpatient Services: Orthopedic Surgery residents will have work in surgery allied for an initial 2 years and will appear in MTA Surgery. This training component will be according to RMU MS Orthopedic Surgery initial 2 years' curriculum. Afterwards, the resident will work in Orthopedic Surgery during 3rd, 4th and 5th year of training.

Outpatient Experiences: Orthopedic Surgery residents should demonstrate expertise in diagnosis and management of patients in acute care clinics and gain experience in dealing with diagnosis of hernia, cholecystitis, acute abdomen, thyroid swelling, and breast lumps etc.

Emergency services: Residents take an early active role in patient care and obtain decision-making roles quickly. Within the Emergency Department, residents direct the initial stabilization of all critical patients, manage airway interventions, and oversee all critical care being first responder, and be able to diagnose surgical emergency such as acute abdomen, blunt trauma abdomen/chest, penetrating injury, and be able to perform minor surgical procedures like chest intubation, central line catheterization, FAST scan etc.

Electives / Specialty Rotations: Orthopedic Surgery resident will elective rotations in a variety of electives including General Surgery, neurosurgery, pediatric surgery, plastic surgery/ Spine surgery. Residents may also select electives at other institutions if the parent department does not offer the experiences they want.

Mandatory Workshops: Residents achieve hands on training while participating in mandatory workshops of Basic surgical skills, Research Methodology, Advanced Life

Support, Communication Skills, Computer & Internet, and Clinical Audit. Specific objectives are given in detail in the relevant section of Mandatory Workshops.

Surgical / procedural competencies: The clinical skills, which a surgeon must have are, varied and complex. A complete list of the same necessary for residents and trainers is given below. Some examples, which are a sub sample of the whole, follow. These are to be taken as guidelines rather than definitive requirements. Key for assessing competencies:

1. Observer status.
2. Assistant status.
3. Performed under direct supervision.
4. Performed under indirect supervision.
5. Performed independently

Note: Levels 4 and 5 for practical purposes are almost synonymous

8.2) TEACHING PROGRAM IN ORTHOPEDICS

- Bedside teaching rounds
- Journal club
- Seminar
- PG case discussion
- X – Ray discussion
- Ortho-radiology meeting

Central session (held in hospital auditorium regarding various topics like CPC, guest lectures, student seminars, grand round, sessions on basic sciences, biostatistics, research methodology, teaching methodology, health economics, medical ethics and legal issues).

8.3) TEACHING SCHEDULE

In addition to bedside teaching rounds, in the department there will be daily hourly sessions of formal teaching per week. The suggested time distribution of each session for department's teaching schedule as follows:

- Journal club Once a week

- Seminar once a week
- PG case discussion Twice a week
- Ortho-radiology meeting Once a month
- Central session as per hospital schedule
- Workshop – once every 3 months

Note:

- All sessions are supervised by faculty members. It is mandatory for all residents to attend the sessions except those posted in emergency.
- All the teaching sessions are assessed by the faculty members at the end of session and marks are given out of 10 and kept in the office for internal assessment.
- Attendance of the residents at various sessions has to be at compulsory.

9 Assessment Guidelines

Assessment

It will consist of action and professional growth oriented student-centered integrated assessment with an additional component of informal internal assessment, formative assessment and measurement-based summative assessment.

Student-Centered Integrated Assessment It views students as decision-makers in need of information about their own performance. Integrated Assessment is meant to give students responsibility for deciding what to evaluate, as well as how to evaluate. It encourages students to 'own' the evaluation and to use it as a basis for self-improvement. Therefore, it tends to be growth-oriented, student-controlled, collaborative, dynamic, contextualized, informal, flexible and action-oriented.

SELF ASSESSMENT BY THE STUDENT

- Each student will be provided with a pre-designed self-assessment form to evaluate his/her level of comfort and competency in dealing with different relevant clinical situations. It will
- be the responsibility of the student to correctly identify his/her areas of weakness and to take appropriate measures to address those weaknesses.

360-DEGREE EVALUATION INSTRUMENT-MULTI-SOURCE FEEDBACK (MSF):

- The students will also be expected to evaluate their peers after the monthly small group meeting. These should be followed by a constructive feedback according to prescribed guidelines and should be nonjudgmental in nature. This will enable students to become good mentors in future.
  - From peers.
  - Paramedical staff.
  - From Patients.
  - From Supervisors.

–

INFORMAL INTERNAL ASSESSMENT BY THE FACULTY

- There will be no formal allocation of marks for the component of Internal Assessment so that students are willing to confront their weaknesses rather than hiding them from their instructors.
- It will include:
  - Punctuality
  - Ward work
  - Monthly assessment (written tests to indicate particular areas of weaknesses)
  - Participation in interactive sessions

FORMATIVE ASSESSMENT

- Will help to improve the existing instructional methods and the curriculum in use

WPBA of Orthopedic Resident in Rawalpindi Medical University

Monthly Assessments in hospital	Online assessments on LMS
DOPS	25 MCQs fortnightly
Mini-CEx	
CBD	
DOPS	
Mini-CEx	
CBD	
360-degree evaluation LOG BOOK	
CBD ➡ DOPS ➡ Mini - CEX after every 03 months. Fort nightly 25 MCQ on LMS	

1. 360 Degree evaluation will be done at every 6 months by:

a. Supervisor/consultant
b. Paramedical staff
c. Patients
d. Self-assessment of postgraduate trainee by himself.

2. LOG BOOK will be maintained by the resident and counter signed by the supervisors.

FEEDBACK TO THE FACULTY BY THE STUDENTS:

- After every three months' students will be providing a written feedback regarding their course components and teaching methods. This will help to identify strengths and weaknesses of the relevant course, faculty members and to ascertain areas for further improvement.

MINI-CLINICAL EVALUATION EXERCISE(MINI-CEX)

This tool evaluates a clinical encounter with a patient to provide an indication of competence in skills essential for good clinical care such as history taking, examination and clinical reasoning. The trainee receives immediate feedback to aid learning. They can be used at any time and in any setting when there is a trainee and patient interaction and an assessor is available.

DIRECT OBSERVATION OF PROCEDURAL SKILLS (DOPS)

A DOPS is an assessment tool designed to evaluate the performance of a trainee in undertaking a practical procedure, against a structured checklist. The trainee receives immediate feedback to identify strengths and areas for development.

CASE-BASED DISCUSSION (CBD)

The CBD assesses the performance of a trainee in their management of a patient to provide an indication of competence in areas such as clinical reasoning, decision-making and application of medical knowledge in relation to patient care. It also serves as a method to document conversations about, and presentations of, cases by trainees. The CBD should focus on a written record (such as written case notes, out-patient letter, and discharge summary). A typical encounter might be when presenting newly referred patients in the out-patient department.

AUDIT ASSESSMENT (AA)

The Audit Assessment tool is designed to assess a trainee's competence in completing an audit. The Audit Assessment can be based on review of audit documentation OR on a presentation of the audit at a meeting. If possible, the trainee should be assessed on the same audit by more than one assessor.

SUMMATIVE ASSESSMENT

It will be carried out at the end of the program to empirically evaluate cognitive, psychomotor and affective domains in order to award diplomas for successful completion of courses.

SECTION 2 COURSE CONTENTS

1) SYLLABUS OF THE FTA

1.1) Theory

- **General Orthopedics**
  - **Infections**
    - General Principles of Infection
    - Osteomyelitis
    - Septic Arthritis
    - Tuberculosis and Other Infections
  - **Tumors**
    - General Principles of Tumors
    - Benign Tumors of Bone
    - Malignant Tumors of Bone
    - Soft Tissue Tumors and Non-Neoplastic Conditions Simulating Bone Tumors
- **Congenital Anomalies**
  - Congenital Anomalies of Lower Extremity
  - Congenital and Developmental Anomalies of Hip and Pelvis
  - Congenital Anomalies of Trunk and Upper Extremity
- **Peripheral Nerve Injuries**
  - Diagnosis and management

- **Microsurgery**
  - Basic principles and techniques
- **Imaging in Orthopedics**
- **Other Non-Traumatic Disorders**
  - Osteochondrosis
  - Rickets and Osteomalacia
  - Metabolic bone disease
  - Cerebral Palsy
  - Paralytic Disorders
  - Neuromuscular Disorders
  - Genetic disorders
  - Osteonecrosis

❖ **Traumatology**

- **Fractures and Dislocations**
  - General Principles of Fracture Treatment
  - Fractures of Lower Extremity
  - Fractures of Hip
  - Fractures of Acetabulum and Pelvis
  - Fractures of Shoulder, Arm, and Forearm
  - Mal-united Fractures
  - Delayed Union and Nonunion of Fractures
  - Acute Dislocations
  - Old Unreduced Dislocations
  - Fractures, Dislocations and Ligamentous Injuries of the hand
  - Fractures and Dislocations of Foot
  - Fractures and Dislocations in Children

❖ **Regional Orthopedics**

- **Spine**
  - Spinal Anatomy and Surgical Approaches
  - Fractures, Dislocations, And Fracture-Dislocations of Spine
  - Pediatric Cervical Spine
  - Scoliosis and Kyphosis

- Lower Back Pain and Disorders of Intervertebral Discs
- Infections of Spine

➢ **Sports Medicine**

- Ankle Injuries
- Knee Injuries
- Shoulder and Elbow Injuries
- Recurrent Dislocations

➢ **The Hand**

- Basic Surgical Technique and Aftercare
- Acute Hand Injuries
- Flexor and Extensor Tendon Injuries
- Wrist Disorders
- Paralytic Hand
- Cerebral Palsy of the Hand
- Arthritic Hand
- Compartment Syndromes and Volkmann Contracture
- Dupuytren Contracture
- Carpal Tunnel, Ulnar Tunnel, and Stenosing Tenosynovitis
- Tumors and Tumorous Conditions of Hand
- Hand Infections
- Congenital Anomalies of Hand

➢ **The Foot and Ankle**

- Surgical Techniques
- Disorders of Hallux
- PesPlanus
- Lesser Toe Abnormalities
- Rheumatoid Foot
- Diabetic Foot
- Neurogenic Disorders
- Disorders of Nails and Skin Disorders of Tendons and Fascia

❖ **Operative Orthopedics**

➢ **Surgical Techniques and Approaches**

- **Arthrodesis**
    - Arthrodesis of Ankle, Knee and Hip
    - Arthrodesis of Shoulder, Elbow and Wrist
- **Arthroplasty**
    - Arthroplasty of Ankle and Knee
    - Arthroplasty of Hip
    - Arthroplasty of Shoulder and Elbow
- **Amputations**
    - General Principles of Amputations
    - Amputations about Foot
    - Amputations of Lower Extremity
    - Amputations of Hip and Pelvis
    - Amputations of Upper Extremity
    - Amputations of Hand
- **Arthroscopy**
    - General Principles of Arthroscopy
    - Arthroscopy of Lower Extremity
    - Arthroscopy of Upper Extremity

1.2) Practical

- Closed Reduction of Fractures, Dislocations
- Mastering Plastering Techniques
- Debridement of Open Fractures
- External Fixator application
- Internal Fixation of minor fractures with K-wires
- Closed manipulative correction of congenital problems like CTEV & other skeletal deformities. Biopsies – FNAB, FNAC, Trocar needle, open
- Excision of benign lesions
- Tendon lengthening

- Incision and drainage, acute Osteomyelitis / Septic Arthritis
- Skull tongs application
- Tension band wiring
- Inter-fragmentary compression
- Plate Osteosynthesis of Forearm bones
- Carpal Tunnel Release
- Bone grafting
- Soft tissue releases
- Interlocking IM Nailing of Tibia & Femur
- Humerus Plating
- Ankle Fracture Fixations
- DHS Fixation
- Hemi-arthroplasty Hip
- Caudal epidural injections
- Facet Block
- Vertebroplasty
- Exposure of posterior spine
- Laminectomy
- Anterior and posterior instrumentation of spine
- Bone Skills Lab
- Tension Band Wiring
- Lag Screw Inter-Fragmentary Compression
- Broad Plating
- Narrow Plating
- External Fixation
- Cancellous Screw Fixation
- Dynamic Hip Screw Fixation
- Dynamic Condylar Screw Fixation
- Tibia Intramedullary Interlocking Nailing
- Femur Intramedullary Interlocking Nailing
- Tibial Condyle Fixation

- Elbow fractures Fixation
- Ankle Fractures Fixation
- Pelvis – External Fixation
- Pubic Symphysis – ORIF
- Acetabulum Fracture Fixation
- MIPPO Tibia
- Hemi-arthroplasty
- Spine - Posterior Instrumentation
- Spine – Anterior Instrumentation
- To clinically diagnose, assess, investigate and initially manage all surgical and medical emergencies to learn to assess ABC and perform CPR
- To perform
    - Endotracheal intubation
    - Peripheral and Central intravenous cannulation
    - Intercostal drainage tube insertion
    - Peritoneal aspiration
    - Splintage of the spine and limbs for fracture-dislocations
- To learn the use of certain emergency drugs – adrenaline, atropine, dopamine, Steroids, analgesics etc.
- To learn to apply
    - Glasgow Coma Scale (GCS)
    - AO classification of fractures
    - Gustillo Anderson grading of open fractures
    - Mangled Extremity Severity Scoring
- To learn to communicate with patient's attendants on death of patient
- To learn to handle confidentiality issues

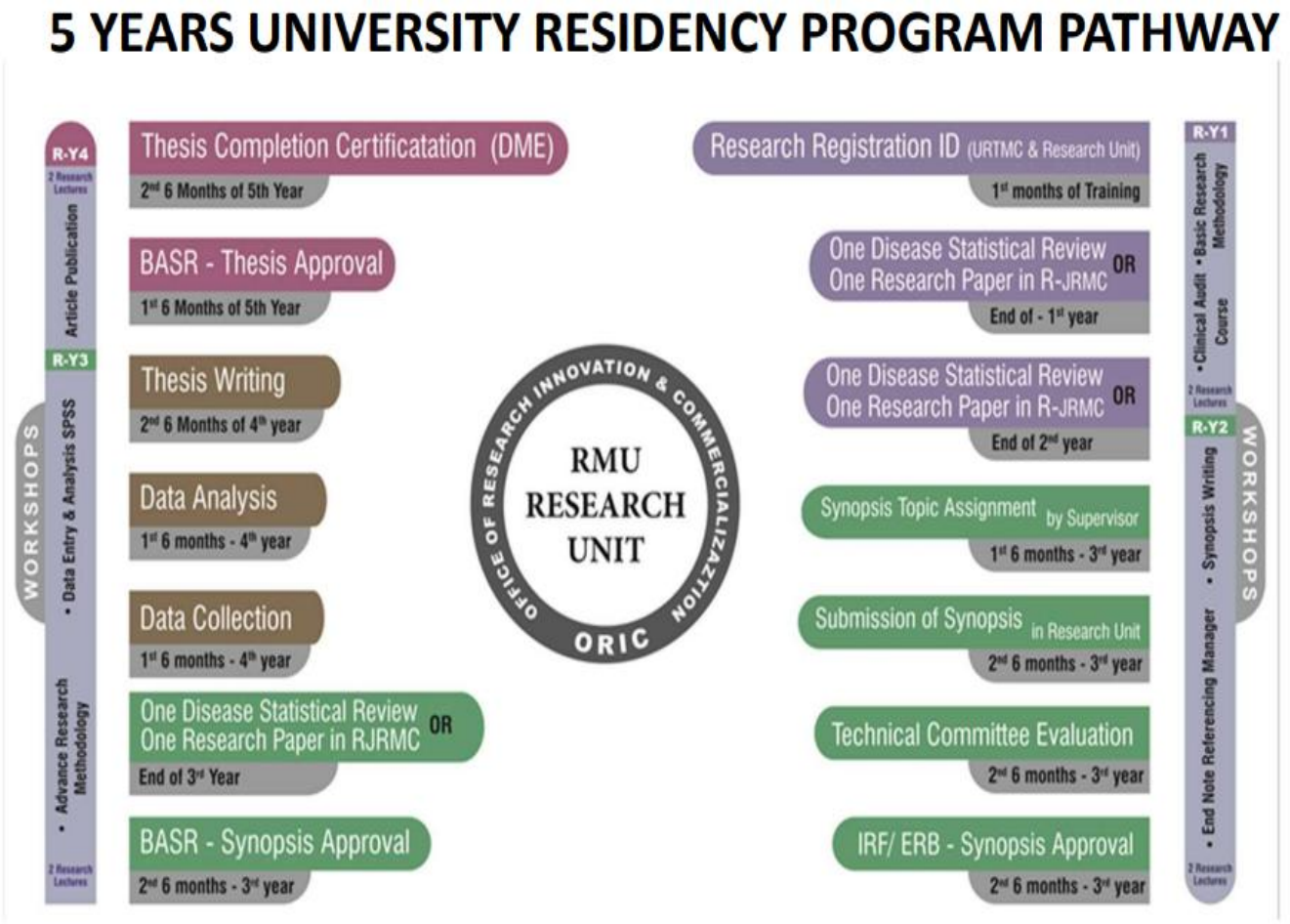
2) SYLLABUS OF THE MTA EXAMINATION

2.1) Theory

- **General Orthopedics**
  - **Infections**
    - General Principles of Infection
  - **Tumors**
    - General Principles of Tumors
    - Benign Tumors of Bone
- **Imaging in Orthopedics**
- **Other Non-Traumatic Disorders**
    - Rickets and Osteomalacia
    - Metabolic bone disease
- **Traumatology**
  - **Fractures and Dislocations**
    - General Principles of Fracture Treatment
    - Fractures of Lower Extremity
    - Fractures of Hip
    - Fractures of Shoulder, Arm, and Forearm
    - Acute Dislocations
    - Fractures and Dislocations in Children
- **Operative Orthopedics**
- **Surgical Techniques and Approaches**
  - **Arthrodesis**
    - Arthrodesis of Ankle, Knee and Hip
    - Arthrodesis of Shoulder, Elbow and Wrist

- **Amputations**
    - General Principles of Amputations
    - Amputations about Foot
    - Amputations of Lower Extremity
    - Amputations of Hip and Pelvis
    - Amputations of Upper Extremity
    - Amputations of Hand

SECTION III Research



1 SUBMISSION OF SYNOPSIS

1. The candidates shall prepare their synopsis as per guidelines provided by the Rawalpindi Medical University.
2. The research topic in clinical subject should have 30% component related to basic sciences and 70% component related to applied clinical sciences. The research topic must consist of a reasonable sample size and sufficient numbers of variables to give training to the candidate to conduct research, to collect & analyze the data.

3. Synopsis of research project shall be submitted by the end of the 3rdyear of MS program. The synopsis after review by an Institutional Review Committee shall be submitted to the University for Consideration by the Research Board, through the Principal / Dean /Head of the institution.
4. **Or else**, if the candidate opts for 02 research publications in PMDC and HEC recognized journals, then he will have to submit 02 research topics along with their synopsis to the University Research Board for approval. He will undertake the study after approval from the board.

2 SUBMISSION OF THESIS

Thesis shall be submitted by the candidate duly recommended by the supervisor. The minimum duration between approval of synopsis and submission of thesis shall be one year, but the thesis cannot be submitted later than 8 years of enrolment.

The research thesis must be compiled and bound in accordance with the thesis format guidelines approved by the university and available on website.

The research thesis will be submitted along with the fee prescribed by the university.

Or else, the candidate can submit copies of 02 research articles published in PMDC and HEC recognized journals which had previously been accepted in the university research board, at least 06 months prior to the examination.

3 E-LOG BOOK

The residents must maintain a log book and get it signed regularly by the supervisor. A complete and duly certified log book should be part of the requirement to sit for MS examination. Log book should include adequate number of diagnostic and therapeutic procedures observed and performed, the indications for the procedure, any complications and the interpretation of the results, routine and emergency management of patients, case presentations in CPCs, journal club meetings and literature review.

INTRODUCTION TO RESEARCH FOR MS ORTHOPEDICS

With advent of Evidence Based Practice over last two to three decades in medical science, merging the best research **evidence** with good clinical expertise and patient values is inevitable in decision making process for patient care. Therefore, apart from receiving per excellence knowledge of the essential principles of medicine and necessary skills of clinical procedures, the trainees should also be well versed and skillful in research methodologies. The training in research being imperative is integrated longitudinally in all five year's training tenure of the trainees.

The purpose of the research training is to provide optimal knowledge and skills regarding research methods and critical appraisal. The expected outcome of this training is to make trainees dexterous and proficient to practically conduct quality research through amalgamation of their knowledge, skills and practice in research methodologies.

ORIENTATION SESSION FOR POST GRADUATE TRAINEES:

I. At the beginning of the research course, an orientation session or an introductory session of one-hour duration will be held, organized by Director, Deputy Directors of ORIC (Office of Research Commercialization and Innovation) of RMU to make trainees acquainted to the research courses during five years post graduate training, the schedule of all scholarly and academic activities related to research and the assessment procedures.

II. Trainees will also be introduced to all the facilitators of the course, organizational structure of ORIC (Annexure 1) and the terms of references of corresponding authorities (Annexure 2) for any further information and facilitation.

III. All the curriculum details and materials for assistance and guidance will be provided to trainees during the orientation session.

IV. The research model of RMU as given in Figure 1 and will be introduced to the newly inducted trainees of RMU.

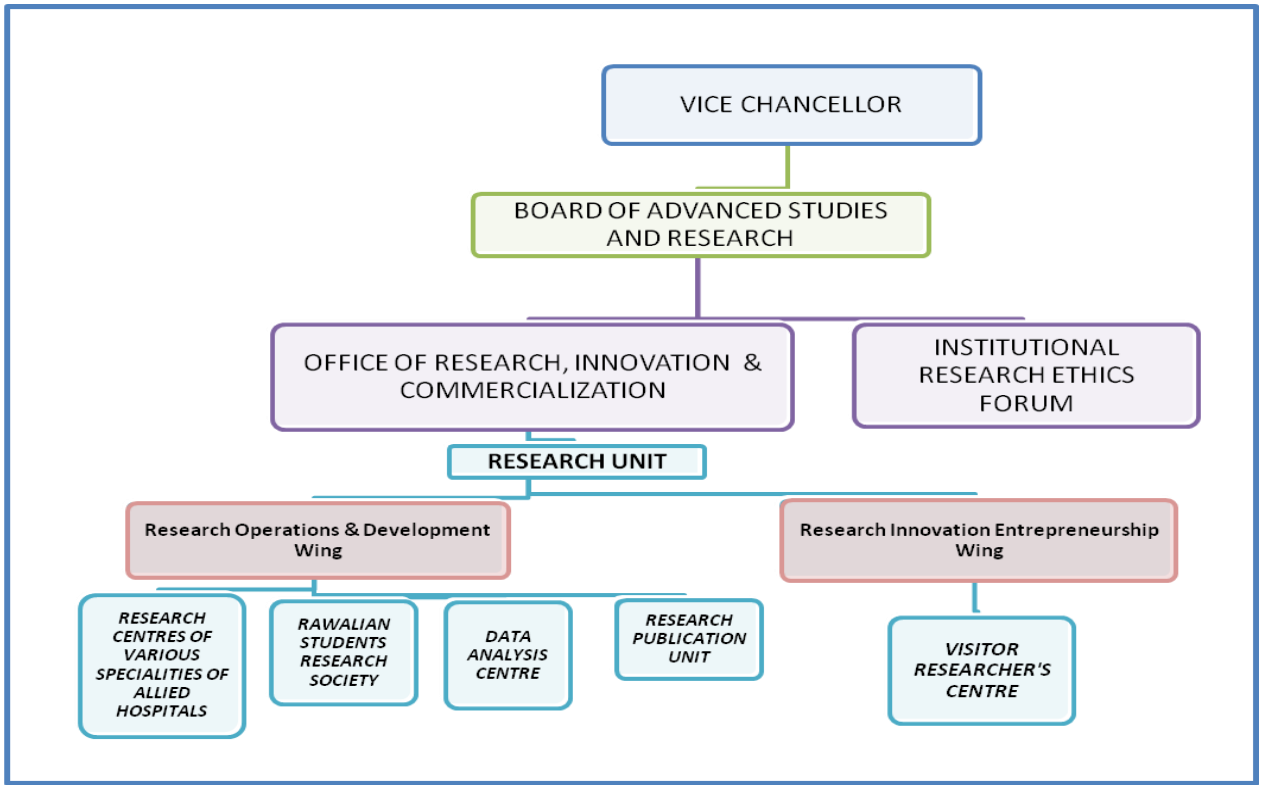


FIGURE 2: MODEL OF RESEARCH AT RAWALPINDI MEDICAL UNIVERSITY

The research training component for Post Graduate Trainees comprises of five years and the Distribution and curriculum for each year is mentioned as follows:

RESEARCH COURSE OF FIRST POST-GRADUATION TRAINING YEAR

PURPOSE OF RESEARCH-YEAR1 (RESEARCH COURSE)

The RESEARCH YEAR 1 or R-Y1 research course of the post graduate trainees intends to provide ample knowledge to trainees regarding the importance of research, its necessity and types. This course will provide them clarity of concepts that what are the priority problems that require research, how to sort them out and select topics for research. It will also teach them the best techniques for exploring existent & previous evidences in research through well-organized literature search and also how to critically appraise them. The course will not only provide them comprehensive knowledge but will also impart optimum skills on how to practical plan, design a research project by educating & coaching them about various

research methodologies. The trainees will get familiarized to research ethics, concepts of protection of human study subjects, practice-based learning, evidence-based practice in addition to the standard ethical, institutional appraisal procedure by Board of Advanced Studies, Research Institutional & Ethics Research Forum of RMU.

LEARNING OUTCOMES OF R-Y1 RESEARCH COURSE

After completion of R-Y1 course the trainees should be efficiently able to:

1. Discuss the value of research in health service in helping to solve priority problems in a local context.
2. Identify, analyze and describe a research problem
3. Review relevant literature and other available information
4. Formulate research question, aim, purpose and objectives
5. Identify study variables and types
6. Develop an appropriate research methodology
7. Identify appropriate setting and site for a study
8. Calculate minimally required sample size for a study.
9. Identify sampling technique, inclusion and exclusion criteria
10. Formulate appropriate data collection tools according to techniques
11. Formulate data collection procedure according to techniques
12. Pre-test data collection tools
13. Identify appropriate plan for data analysis
14. Prepare of a project plan for the study through work plans and Gantt charts
15. Identify resources required for research and means of resources
16. Prepare a realistic study budget in accordance with the work plan.
17. Critically appraise a research paper of any national or international journal.
18. Present research papers published in various national and international journals at journal club.
19. Prepare a research proposal independently.
20. Develop a strategy for dissemination and utilization of research results.
21. Familiarization with application Performa for submission of a research proposal to BASR or IREF.

22. Familiarization with format of presentations and procedure of presentation and defense of a research proposal to BASR or IREF.

23. Familiarization with the supervisor, nominated by the Dean and to develop a harmonious rapport with supervisor.

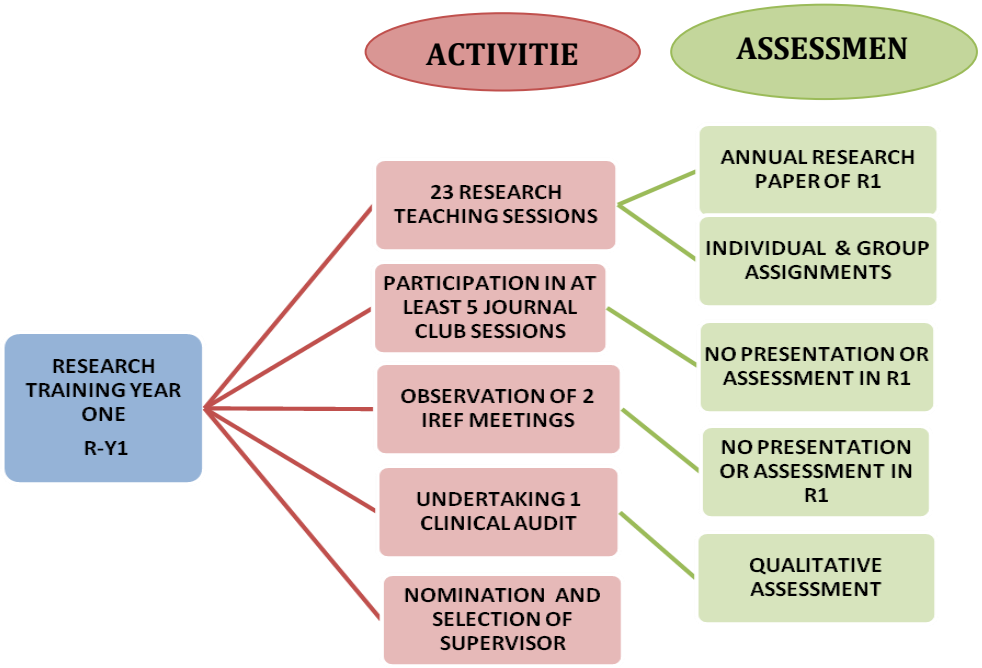


FIGURE 4: A FLOW CHART OF RESEARCH ACTIVITIES OF R-Y1 POST GRADUATE/MD TRAINEE OFRMU AND THEIR ASSESSMENT

RESEARCH COURSE OF SECOND POST GRADUATION TRAINING YEAR

PURPOSE OF R-Y2 RESEARCH COURSE:

The RESEARCH-YEAR 2-R2 research course of the post graduate trainees will provide optimum skills to trainees to actually formulate their individual research proposal of the research project/dissertation, prerequisite to their degrees, in perspective of the knowledge acquired during year one of the training i.e. R-Y1. This course will provide them clarity of basic epidemiological and biostatistics concepts that they essentially require to transform their data into substantial evidences, to answer their research questions for their individual research project/dissertation. The course will also make them proficient to follow the standard ethical and institutional appraisal procedures of Rawalpindi medical University by Board of Advanced Studies and Research and Institutional and Ethics Research Forum of RMU. It will also impart them expertise to explore evidences in research through well-organized literature search and also how to critically appraise them.

LEARNING OUTCOMES OF R-Y2 RESEARCH COURSE

After completion of R-Y2 course the trainees should be efficiently able to:

1. Identify and define the basic concepts of Epidemiological measures and biostatistics.
2. Formulate and pretest to finalize all the data collection tools for the research projects
3. Identify and execute proficiently all procedures required for data analysis and interpretation.
4. Analyze and interpret the data collected for a research project and draw conclusions related to the objectives of study.
5. Write a clear and concise research report (paper for a peer reviewed journal/dissertation) and a summary of the major findings and recommendations for each of the different parties interested in the results.
6. Present the major findings & the recommendations of a study to policy-makers managers & other stakeholders to finalize the recommendations.
7. Prepare a plan of action for the dissemination, communication and utilization of the findings and (if required) make recommendations for additional future research.
8. Critically appraise a research paper of any national or international journal.
9. Present research papers published in various national and international journals at journal club.
10. Prepare final draft of the research proposal of the Dissertation project, requisite to the post-graduation degree of trainee, under the guidance of the nominated supervisor.
11. Fill in an application Performa for submission of Dissertation's research proposal to BASR or IREF.
12. Present and defend a research proposal to BASR or IREF.

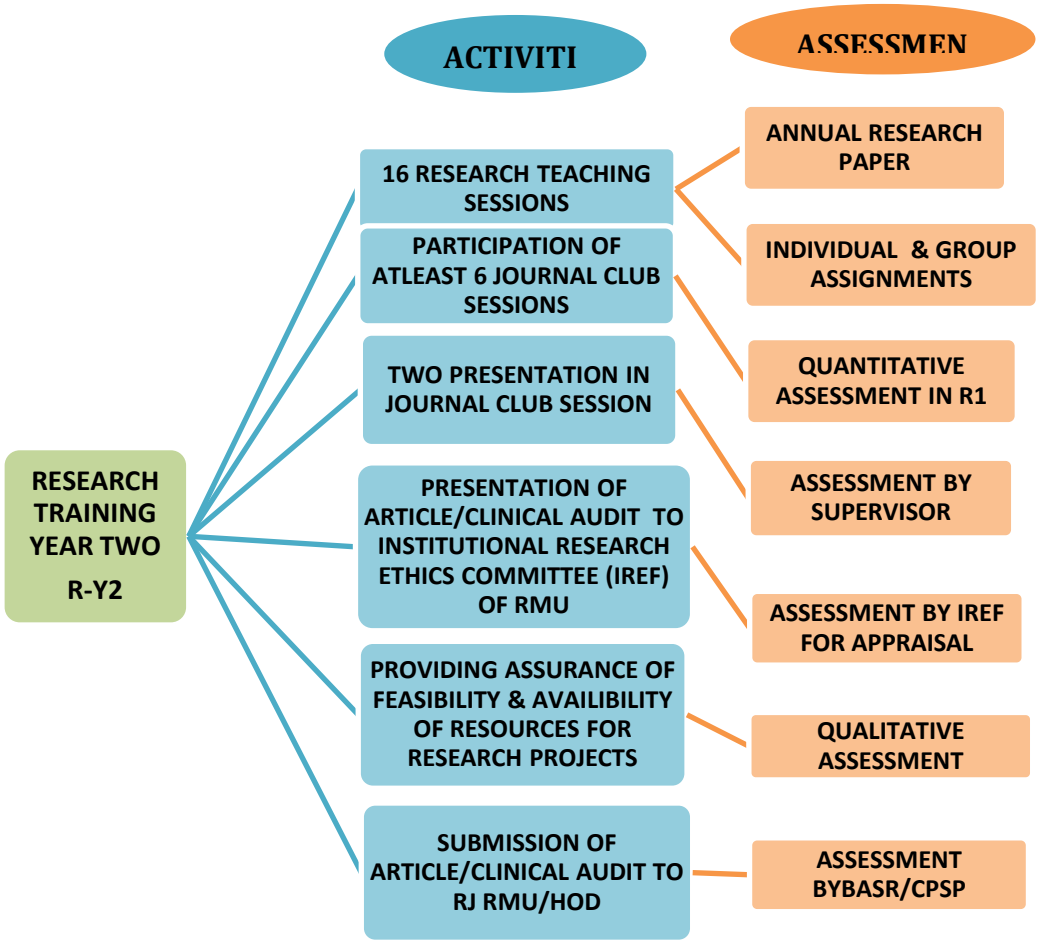


FIGURE 5: A FLOW CHART OF RESEARCH ACTIVITIES OF R-Y2 POST GRADUATE/MD TRAINEE OF RMU AND THEIR ASSESSMENTS

RESEARCH COURSE OF THIRD POST GRADUATION TRAINING YEAR

PURPOSE OF R-Y3 RESEARCH COURSE:

Utilizing all the knowledge and skills in research, accrued during first two years, the post graduate trainees of RMU, will be dexterous enough to actually execute a research project and implement efficiently and proficiently all the activities of the research project that they will have planned during period of R-Y1 to R-Y2. During the third year of training post graduate trainees of MD Gastroenterology will select his/her thesis topic. This course will provide them an opportunity to revitalize and update their concepts, knowledge and skills in research methodologies.

LEARNING OUTCOMES OF R-Y3 RESEARCH COURSE

After completion of R-Y3 course the trainees should be efficiently able to:

1. Revise and rejuvenate all the basic concepts of Epidemiological measures and biostatistics.
2. Collate the information gathered through an extensive literature review relevant to study topics finalized and formulate an extensive write up of literature for research project.
3. Collect and store high quality information for their research project in an honest and unambiguous way.
4. Utilize skills to enter, analyze and interpret the data collected for a research project
5. Write a clear and concise research report (research paper for a peer reviewed journal/dissertation) and a summary of the major findings and recommendations for each of the different parties interested in the results.

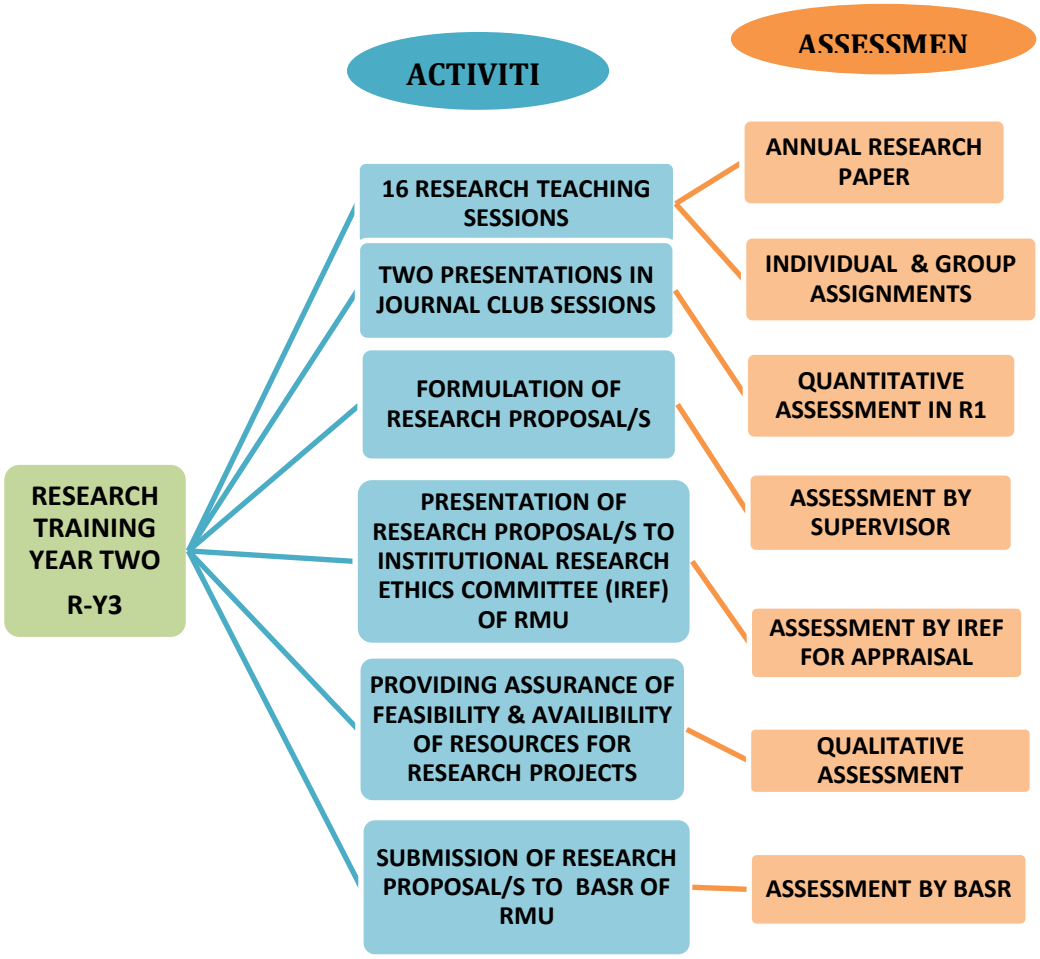


FIGURE 6: A FLOW CHART OF RESEARCH ACTIVITIES OF R-Y3 MD RESIDENTS OF RMU AND THEIR ASSESSMENTS

RESEARCH COURSE OF FOURTH POST GRADUATION TRAINING YEAR

RESEARCH-YEAR4

PURPOSE OF R-Y4 RESEARCH COURSE:

Utilizing all the knowledge and skills in research, accrued during first two years, the post graduate trainees of RMU, will be dexterous enough to actually execute a research project and implement efficiently and proficiently all the activities of the research project that they will have planned during period of R-Y1 to R-Y2. During the third year of training post graduate trainees will collect all the information and data and to explore answer to their research questions formulated for their individual research project/dissertation, prerequisite to their degrees. This course will provide them an opportunity to revitalize and update their concepts, knowledge and skills in research methodologies.

LEARNING OUTCOMES OF R-Y4 RESEARCH COURSE

After completion of R-Y4 course the trainees should be efficiently able to:

a) Revise and rejuvenate all the basic concepts of Epidemiological measures and biostatistics
b) Identify and execute proficiently all procedures required for data collection, data analysis and interpretation.
c) Analyze and interpret the data collected for a research project and draw conclusions related to the objectives of study.
d) Collate the information gathered through an extensive literature review relevant to study topics finalized and formulate an extensive write up of literature for research project.
e) Collect and store high quality information for their research project in an honest and unambiguous way

FIGURE 4 (A). A FLOW CHART OF RESEARCH ACTIVITIES AND ASSESSMENTS OF R-Y4 MD RESIDENTS OF RMU WHO WILL OPT FOR DISSERTATION WRITING

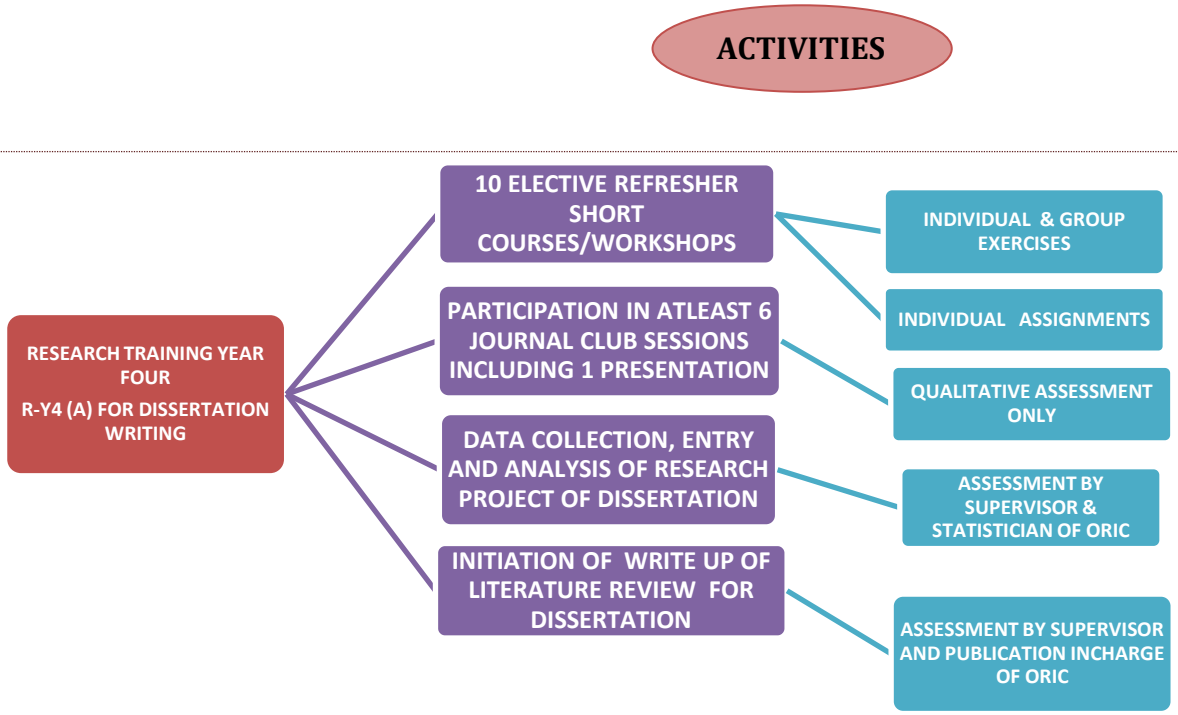
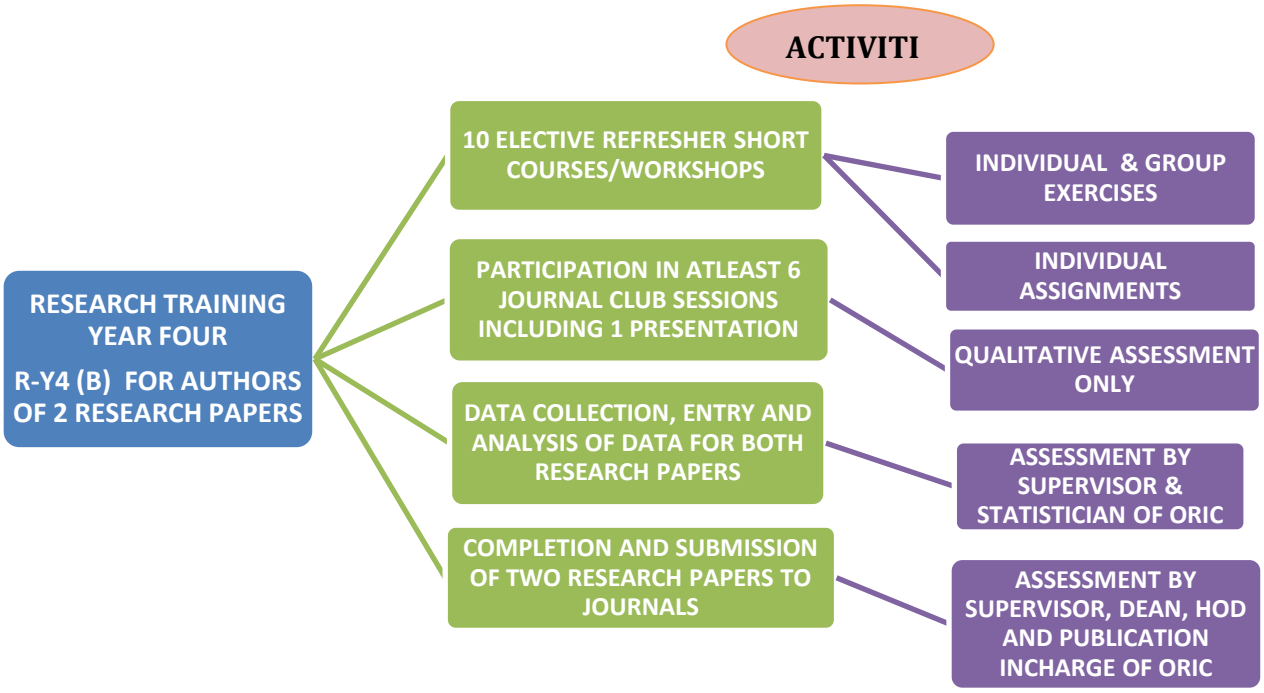


FIGURE 4 (B). A FLOW CHART OF RESEARCH ACTIVITIES AND RELEVANT ASSESSMENTS

OF R-Y4 MD RESIDENTS OF RMU OPTING FOR PUBLICATION OF TWO RESEARCH PAPERS AS REQUISITE TO MD DEGREE



COMPLETION OF RESEARCH PROJECT AND ITS WRITE UP AS A DISSERTATION

This section A implies for MD scholars with option A i.e. writing dissertation

i. The trainees writing dissertations should have completed their data collection, data analysis & interpretation in fourth year of training and will have also initiated write up literature view for the dissertation.

ii. As soon as the year forth of training commence, these trainees should complete the introduction and literature review sections of their dissertations along with proper referencing during first three months of R-Y4. They will be continuously guided in this task by their supervisors, research associates and the publication in charge at the ORIC.

iii. The trainees, In the meanwhile, will also seek continuous assistance of statisticians of Data analysis unit of ORIC for data analysis in statistical software. Trainees will be guided how to interpret the results, how to determine the statistical significances and how to write these results in textual, tabulated and graphical forms. They will have to complete their data analysis and write up of results till fourth month of year 4.

iv. The supervisor and publication in charge at ORIC will also guide the trainee to write the section of "discussion" for their dissertations based on the comparison of the findings of their study with the previously available research nationally as well as internationally.

v. The trainees will also identify strengths and weaknesses of their study and should make recommendations with statement of final conclusion.

vi. According to the required referencing systems the reference lists and in text citation will also be completed correctly.

vii. After writing the abstract and cover pages and annexure of the dissertation, the trainee will submit his/her dissertation's final draft to publication in charge ORIC for plagiarism detection through turn-it-in software. Any dissertation that will have originality score less than 90% or similarity index more than 10% will be returned back to trainees for rephrasing till the eligible scores will be reached.

viii. Then the trainee should submit final draft of dissertation to the supervisor and head of department till end of fifth month of year for final modifications. Since the supervisor will be incessantly involved in every aspect of the project since the beginning and will be persistently guiding the procedure, so he/she should not take more than 10 days to give final review to dissertation of the trainee with written feedback that will be entered in a structured Performa with recommendations for improvement or corrections. The Head of Department will also provide his feedback within 10-15 days.

ix. Based on the feedback of the reviews, the trainee will make final editing and will get the dissertation printed and submitted to the degree awarding authority accordingly (BASR for MD trainees and CPSP for post graduate trainees of fellowship) for review for acceptance before third week of sixth month of year 4.

x. The trainee will also submit a copy of dissertation to head of department, the Dean, Director of ORIC and Chairperson of BASR that will be dealt as a confidential document in order to avoid potential risk of plagiarism.

xi. While the dissertations will be under review by the degree awarding authority for acceptance, the trainees will be continuously guided by the supervisor and the research associates at ORIC regarding defense of their dissertation. They will be guided how to make effective presentations according to the format provided by the examination authorities and also how to successfully and confidently respond to the queries of examiners.

xii. In case the dissertation is sent back with recommended corrections or modifications, the supervisor and research associates at ORIC will assist the trainee on urgent basis to get it rectified and resubmitted within at least 10 days' time and not more than it.

RESUBMISSION OF RESEARCH PAPER/S IN CASE MODIFICATIONS ADVISED OR REJECTED FOR PUBLICATION BY A JOURNAL

This section B implies only for MS Scholars who will be opt for two research paper and provided one or both of their research paper/s is/are sent back for modifications or rejected publication.

i. In case the research paper/s is/are sent back with recommended corrections or modifications, the supervisor, publication in charge and concerned facilitators at ORIC will assist the trainee on urgent basis to get it rectified and resubmitted within next 10 days' time.

ii. In case any of the paper is refused publication by a journal even then the supervisor and publication unit at ORIC will assist the trainee on urgent basis, to get it rectified and resubmitted to another target journal of choice within next 10 days' time without any delay.

SUBMISSION OF ACCEPTANCE LETTERS OF APPROVED RESEARCH PAPER/PAPERS AND SUBMISSION OF HARD AND SOFT COPIES OF PUBLISHED RESEARCH PAPER/S

This section C implies only for the MS Scholars who will be opt for two research paper submission and provided their research paper/s is/are approved by journals and are published.

i. In case the research paper/s is/are approved by the target journals, the trainee will submit the letter of acceptance/s copies to supervisor, HOD, Dean and Publication in charge of ORIC.

ii. When the original article will be published in journal/s, then the trainee will submit hard and soft copies of the original journal with his/her published articles copies to supervisor, HOD, Dean and Publication in charge of ORIC and BASR.

FIGURE 5 (A). A FLOW CHART OF RESEARCH ACTIVITIES AND ASSESSMENTS OF R-Y4 MS RESIDENT OF RMU WHO WILL OPT FOR DISSERTATION WRITING

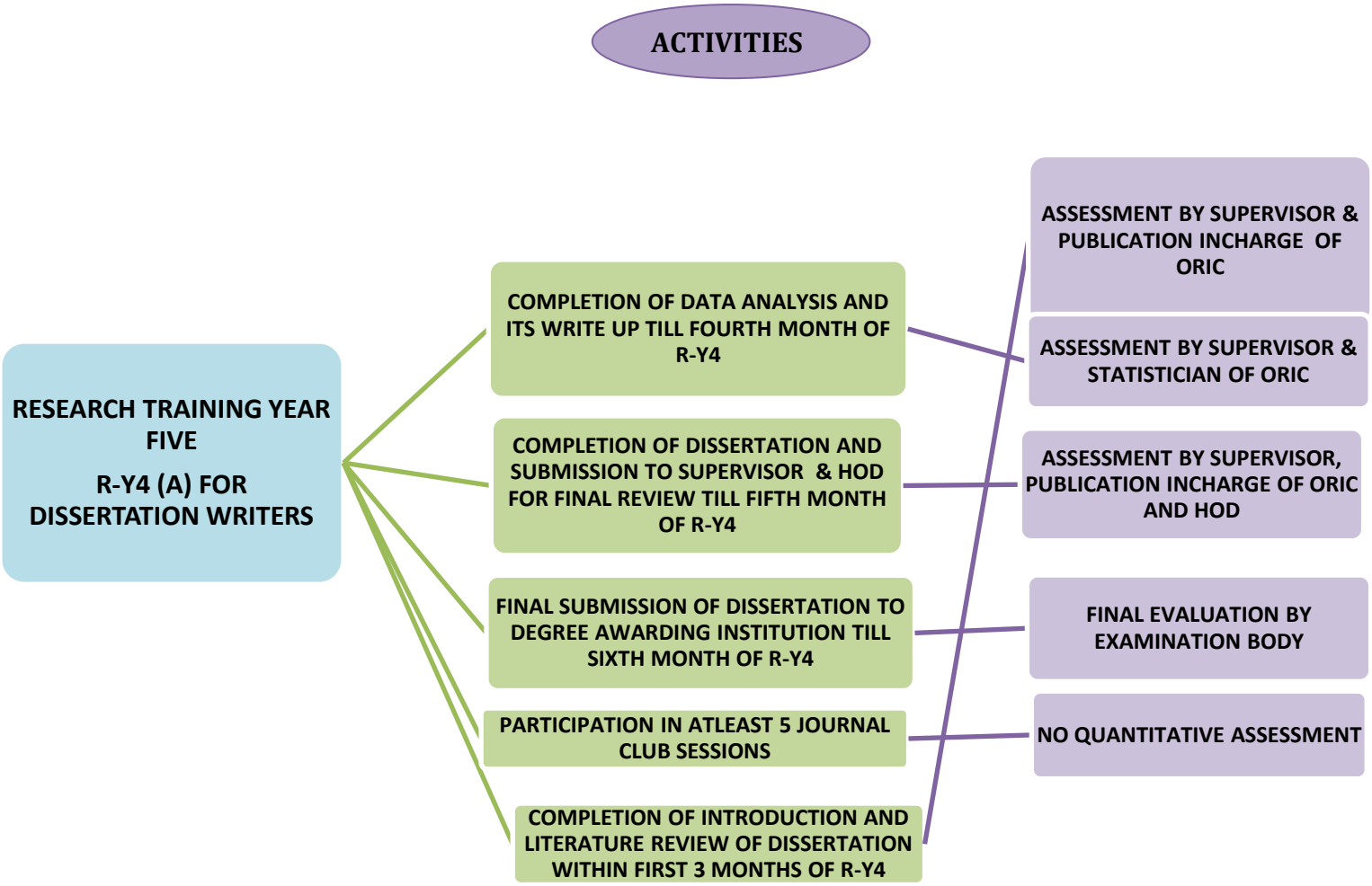
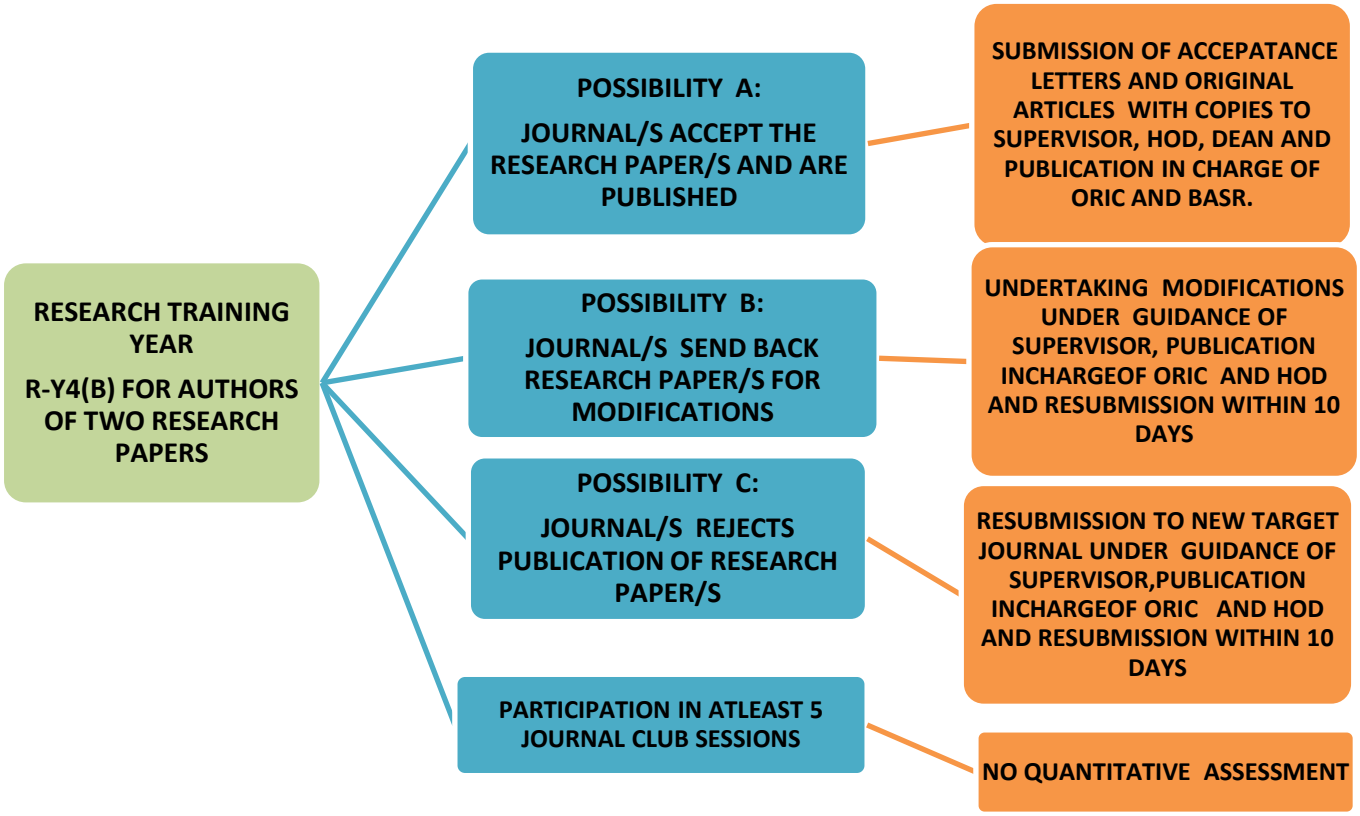
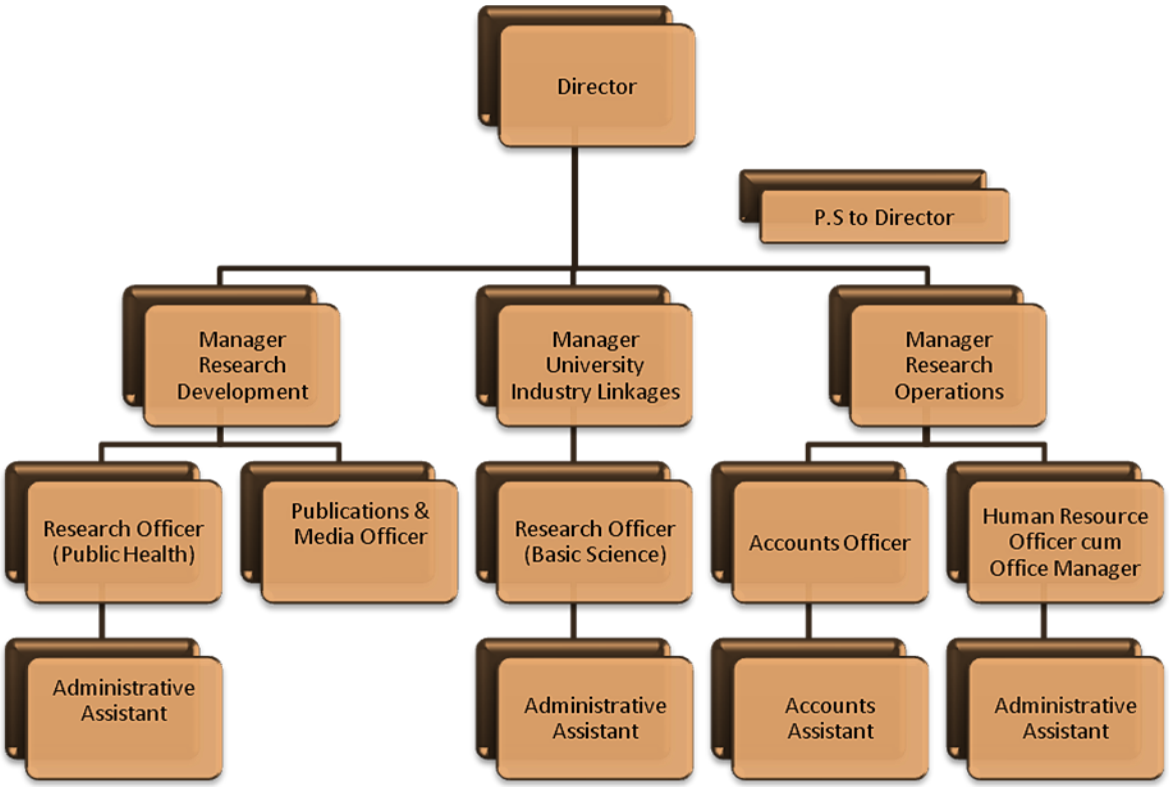


FIGURE 5 (B). A FLOW CHART OF RESEARCH ACTIVITIES AND ASSESSMENTS

OF R-Y4 MS RESIDENTS OF RMU WHO WILL OPT FOR 2 RESEARCH PAPERS AS REQUISITE TO MS DEGREE



ANNEXURE 1: THE ORGANIZATION CHART OF ORIC RMU



Note: Managers of ORIC are also referred to as Deputy Directors in RMU

SECTION IV WORKSHOPS

Workshops (5 hours each for 3 days)

S.NO	Name of the Workshop	Learning Objectives	Topics to be Covered
1.	**Biostatistics & Research Methodology (2 days)**	• To understand the basics of Bio-Statistics • To critique why research is important? • To discuss the importance of Selecting a Field for Research • To prepare oneself for Participation in National and International Research • To prepare oneself for Participation in Pharmaceutical Company Research • To interpret the importance of research ideas & Criteria for a good research topic • To discuss Ethics in Health Research • To learn to write a Scientific Paper • To learn to make a Scientific Presentation • To learn to make a purposeful literature search	1. Introduction to Bio-Statistics 2. Introduction to Bio- Medical Research Why research is important? 3. What research to do? i. Selecting a Field for Research ii. Drivers for Health Research iii. Participation in National and International Research iv. Participation in Pharmaceutical Company Research v. Where do research ideas come from vi. Criteria for a good research topic Ethics in Health Research 4. Writing a Scientific Paper 5. Making a Scientific Presentation & Searching the Literature
2.	**Introduction to computer/Information Technology & Software (2 days)**	By the end of this workshop student should be able to: • Appropriately start up and shut down your computer. • Navigate the operating system	1.Hardware and Software • Understand the main components of a computer, including input and output devices. • Understand the function of communication devices such as smart phones and tablets.

		and start applications. • Perform basic functions of file management. • Perform basic functions in a word processor and spreadsheet. • Manage print settings and print documents. • Receive and send email. • Use a web browser to navigate the Internet. • work with windows, toolbars, and command menus • perform basic word processing and graphic tasks • make a Power Point presentation • explore Web browsing basics • back up files • save, copy, and organize your work • to enter data accurately in software of Statistical Package for Social Sciences	• Understand the role of Operating Systems, programs and apps. 2.Windows • Turning on the computer and logging on. • The Windows screen. • Running programs from the Start Menu. • Minimizing, maximizing, moving, resizing and closing windows. • Logging off and shutting down your computer. 3.Working with Programs • Running multiple programs. • Desktop icons and creating a desktop shortcut. • Managing programs from the taskbar. • Closing programs. 4.File Management • Managing Windows Explorer. • Creating, moving, renaming and deleting folders and files. • Understandings file extensions. • Viewing storage devices and network connections. • Managing USB flash drives. 5.Word Processing • Creating documents in Microsoft Word. • Typing text, numbers and dates into a document. • Easy formatting. • Checking the spelling in your document. • Making and saving changes to your document. • 6.Power Point Making Power Point presentation 7.Spreadsheets • Understanding spreadsheet functionality. • Creating spreadsheets in Microsoft Excel. • Typing text numbers and dates into a worksheet. • Easy formulas. • Easy formatting. • Charting your data. • Making and saving changes to your workbook. • Printing a worksheet. 8.Printing

			• Print preview. • Print settings. • Managing the print queue. 9.Using Email • The Outlook mail screen elements. • Composing and sending an email message. • Managing the Inbox. 10.Accessing the Internet • Going to a specific website and bookmarking. • Understanding how to search/Google effectively. • Copy and paste Internet content into your documents and emails. • Stopping and refreshing pages. • Demystifying the Cloud. • Understanding social media platforms such as Face book and Twitter. • Computer security best practices. 11.Statistical Package for Social Sciences • general understanding for data entry
3.	**communication skills (2 days)**	• To learn to use Non-Medicinal Interventions in Communication Skills of Clinical Practice • To discuss the importance of counseling • To role play as a counselor • To learn to manage a conflict resolution • To learn to break bad news • To discuss the importance of Medical Ethics,	1. Use of Non-Medicinal Interventions in Clinical Practice Communication Skills 2. Counseling 3. Informational Skills 4. Crisis Intervention/Disaster 5. Management Conflict Resolution 6. Breaking Bad News 7. Medical Ethics, Professionalism and Doctor-Patient Relationship Hippocratic Oath 8. Four Pillars of Medical Ethics (Autonomy, Beneficence, Non-maleficence and Justice) 9. Informed Consent and Confidentiality 10. Ethical Dilemmas in a Doctor's Life

		Professionalism and Doctor-Patient Relationship Hippocratic Oath • To learn to take an informed consent • To illustrate the importance of confidentiality • To summarize Ethical Dilemmas in a Doctor's Life	
4.	**Advanced trauma Life Support (2 days)**	Upon successful completion of the workshop, the student will be able to: • Recognize and initiate early management of pre-arrest conditions that may result in cardiac arrest or complicate resuscitation outcome • Demonstrate proficiency in providing BLS care, including prioritizing chest compressions and integrating automated external defibrillator (AED) use • Recognize and manage respiratory arrest • Recognize and manage cardiac arrest until termination of resuscitation or transfer of care, including immediate post-cardiac arrest care • Recognize and initiate early management of ACS, including appropriate disposition • Recognize and initiate early management of stroke, including	The workshop is designed to give students the opportunity to practice and demonstrate proficiency in the following skills used in resuscitation: 1. Systematic approach 2. High-quality BLS 3. Airway management 4. Rhythm recognition 5. Defibrillation 6. Intravenous (IV)/intraosseous (IO) access (information only) 7. Use of medications 8. Cardio version 9. Transcutaneous pacing 10. Team dynamics 11. Reading and interpreting electrocardiograms (ECGs) - Be able to identify—on a monitor and paper tracing—rhythms associated with bradycardia, tachycardia with adequate perfusion, tachycardia with poor perfusion, and pulseless arrest. These rhythms include but are not limited to: ○ Normal sinus rhythm ○ Sinus bradycardia ○ Type I second-degree AV block ○ Type II second-degree AV block ○ Third-degree AV block ○ Sinus tachycardia ○ Supraventricular tachycardias ○ Ventricular tachycardia ○ Asystole ○ Ventricular fibrillation ○ Organized rhythm without a pulse 12. Basic understanding of the essential drugs used in: ○ Cardiac arrest

		appropriate disposition • Demonstrate effective communication as a member or leader of a resuscitation team and recognize the impact of team dynamics on overall team performance	○ Bradycardia ○ Tachycardia with adequate perfusion ○ Tachycardia with poor perfusion ○ Immediate post–cardiac arrest care

SECTION V LIFE CYCLE OF MS ORTHPEDICS

Milestones to be Achieved by Trainees

CLINICAL COMPETENCIES FOR 1ST, 2ND, 3RD,4TH AND 5TH YEAR MS ORTHOPEDIC SURGERY TRAINEES CLINICAL COMPETENCIES\SKILL\PROCEDURE

The clinical competencies, a specialist must have, are varied and complex. A complete list of the skills necessary for trainees and trainers is given below. The level of competence to be achieved each year is specified according to the key, as follows:

1. Observer status
2. Assistant status
3. Performed under supervision
4. Performed under indirect supervision
5. Performed in dependently

Note: Levels 4 and 5 for practical purposes are almost synonymous

1) EPAs of Orthopedic Surgery RMU

CLINCAL COMPETENCIES	PGT Year-2		PGT Year -3		PGT Year -4		PGT Year -5	
	EPA	Number of Cases	EPA	Number of Cases	EPA	Number of Cases	EPA	Number of Cases
HISTORY TAKING	3	20	4	40	5	40	5	40
PHYSICAL EXAMINATION	3	20	4	40	5	40	5	40
ORDERING INVESTIGATIONS	3	20	4	40	5	40	5	40
INTERPRETING RESULTS	3	20	4	40	5	40	5	40
DECIDING AND IMPLEMENTING APPROPRIATE TREATMENT	2	20	3	40	4	40	5	40
POST OPERATIVE MANAGEMENT & MONITORING	2	20	3	40	4	40	5	40
PRESENTATION: SKILLS LONG CASES	2	8	3	16	4	16	5	16
PRESENTATION: SKILLS SHORT CASES	2	30	3	60	4	60	5	60
USE OF ORTHOPEDIC INSTRUMENTS	2	20	3	40	4	40	5	40
SKELETAL TRACTION	3	12	4	24	5	24	5	24
APPLICATION OF PLASTER OF PARIS CAST	3	40	4	80	5	80	5	80
CLOSED TREATMENT (MANIPULATIONS)	2	20	3	30	4	40	5	40
CLOSED TREATMENT OF DISLOCATIONS	2	20	3	40	4	40	5	40
BIOPSY	2	5	3	10	4	10	5	10
EXTERNAL FIXATION OF FRACTURES OF LOWER LIMB	2	20	3	20	4	20	5	20
EXTERNAL FIXATION OF FRACTURES OF UPPER LIMB	2	10	3	10	4	10	5	10
BONE GRAFTING	2	5	3	10	4	10	5	10

FIXATION OF BONES WITH PLATES	1 / 2	8	3	16	4	16	5	16
INTRAMEDULLARY NAILING OF LONG BONES	1 / 2	13	3	25	4	25	5	25
FIXATION OF TROCHANTERIC AND NECK OF FEMUR FRACTURES	1 / 2	10	3	20	4	20	5	20
FIXATION OF FRACTURE AROUND KNEE JOINT	1 / 2	5	3	10	4	10	5	10
COMPLEX TRAUMA	1	4	2	08	3	08	4 / 5	08
OSTEOTOMIES	1	3	2	05	3	05	4 / 5	05
ARTHRODESIS	1	3	2	05	3	05	4 / 5	05
AMPUTATION	2	5	3	10	4	10	5	10
CTEV SURGERY	1	3	2	05	3	05	4 / 5	05
DDH SURGERY	1	3	2	05	3	05	4 / 5	05
HEMIARTHROPLASTY OF HIP	1	5	2	10	3	10	4 / 5	10
FRACTURE FIXATION OF HAND AND WRIST	2	5	3	10	4	10	5	10
TOTAL JOINT REPLACEMENT (THR & TKR)	1	3	2	05	3	05	4 / 5	05
ARTHROSCOPY OF KNEE JOINT	1	3	2	05	3	05	4 / 5	05
BONE TUMOR SURGERY	1	3	2	05	3	05	4	05

2) TABLE OF SPECIFICATIONS FOR FIRST YEAR

IN GENERAL SURGERY

Topics To Be Taught	Learning Objective Student should be able to know:	Teaching Methods	Assessment
1. History Taking (Knowledge)	To progressively develop the ability to obtain a relevant focused history from increasingly complex patients & challenging circumstances To record accurately and synthesize history with clinical examination & formulation of management plan according to likely clinical evolution Recognizes the importance of different elements of history Recognizes the importance of clinical (particularly cognitive impairment), psychological, social, cultural and nutritional factors particularly those relating to ethnicity, race, cultural or religious beliefs and preferences, sexual orientation, gender and disability Recognizes that patients do not present history in structured fashion and that the history may be influenced by the presence of acute and chronic medical conditions Know causes and risk factors for conditions relevant to mode of presentation Recognizes that history should inform examination, investigation & management.	Bedside teaching in wards and outpatient departments	mini-CEX MCQs
2. History Taking (Skills)	Identify and overcome possible barriers (eg cognitive impairment) to effective communication Manage time and draw consultation to close appropriately. Supplement history with standardized instruments or questionnaires when relevant Manage alternative and conflicting views from family, careers and friends Assimilate history from the available information from patient and other sources Recognize and interpret the use of nonverbal communication from patients and careers Focus on relevant aspects of history\ Show respect and behave in accordance with Good Medical Practice	Bedside teaching in wards & outpatient Departments	mini-CEX

4.Clinical Examination (knowledge)	• To progressively develop the ability to perform focused and accurate clinical examination in increasingly complex patients and challenging circumstances • To relate physical findings to history in order to establish diagnosis and formulate a management plan • Understand the need for a valid clinical examination • Understand the basis for clinical signs and the relevance of positive and negative physical signs • Recognize constraints to performing physical examination and strategies that may be used to overcome them • Recognize the limitations of physical examination and the need for adjunctive forms of assessment to confirm diagnosis	Bedside teaching in wards and outpatient departments	**CBD mini-CEX ACAT**
5. clinical Examination (Skills)	• Perform an examination relevant to the presentation and risk factors that is valid, targeted and time efficient • Recognize the possibility of deliberate harm in vulnerable patients and report to appropriate agencies • Interpret findings from the history, physical examination and mental state examination, appreciating the importance of clinical, psychological, religious, social and cultural factors • Actively elicit important clinical findings • Perform relevant adjunctive examinations including cognitive examination such as Mini Mental state Examination (MMSE) and Abbreviated Mental Test Score (AMTS)	Bedside teaching in wards and outpatient departments	**CBD mini-CEX ACAT**
6. Clinical Examination (Attitude)	• Show respect and behaves in accordance with Good Medical Practice	Bedside teaching in wards & outpatient	**CBD, mini CEX MSF**
7. Time Management & Decision Making	• To become increasingly able to prioritize and organize clinical and clerical duties in order to optimize patient care. To become increasingly able to make appropriate clinical and clerical decisions in order to optimize the effectiveness of the clinical team resource	Bedside teaching in wards and outpatient departments	**ACAT CBD**
8. Decision Making & Clinical Reasoning	• To progressively develop the ability to formulate a diagnostic and therapeutic plan for a patient according to the clinical information available • To progressively develop the ability to prioritize the diagnostic and therapeutic plan • To be able to communicate the diagnostic and therapeutic plan appropriately	Bedside teaching in wards	**ACAT CBD mini-CEX**

SECTION VI EVALUATION AND ASSESSMENT STRATEGIES

MTA, FTA, THESIS DEFENSE

PART-I(**MTA**) EXAMINATION

- All candidates admitted in MS Orthopedics course shall appear in Part-I examination at the end of 1st year.
- Conducted by the General Surgery Department.
- MTA will be conducted at the end of 2nd year.
- MTA will be having 2 papers.

  1) One from General Surgery.

  2) One from basic Orthopedics.

PART-II(**FTA**) EXAMINATION

- For FTA all candidates admitted in MS Orthopedics course shall appear in Part-II(written +clinical examination) at the end of structured training program (end of 5th calendar year), and having passed the part I examination.
- However, a candidate holding FCPS / MRCS / Diplomat / equivalent qualification in Orthopedic Surgery shall be exempted from Part-I Examination and shall be directly admitted to Part-II Examination, subject to fulfillment of requirements for the examination.
- The examination shall be held on biannual basis.

  a. To be eligible to appear in Part-II examination the candidate must submit;

b. Duly filled, prescribed Admission Form to the Controller of Examinations duly recommended by the Principal/Head of the Institution in which he/she is enrolled;

c. A certificate by the Principal/Head of the Institution, that the candidate has attended at least 75% of the lectures, seminars, practical/clinical demonstrations;

d. E-Log book and Original Log Book complete in all respect and duly signed by the Supervisor (for Oral & practical/clinical Examination); certificate of having passed the Part-I examination;

e. Examination fee as prescribed by the University.

THE PART-II (FTA)CLINICAL EXAMINATION SHALL HAVE THE FOLLOWING COMPONENTS:

- To be declared successful in Part-II examination the candidate must secure 60% marks in each component and 50% in each sub-component. Only those candidates, who pass in theory papers, will be eligible to appear in the Oral & Practical/ Clinical Examination.
- The candidates, who have passed written examination but failed in Oral & Practical/ Clinical Examination, will re-appear only in Oral &Practical / Clinical examination.
- The maximum number of attempts to re-appear in oral & practical/clinical Examination alone shall be Three, after which the candidate shall have to appear in both written and oral & practical/clinical examinations as a whole.
- The candidate with 80% or above marks shall be deemed to have passed with distinction.
- E-Log Book/Assignments: Throughout the length of the course, the performance of the candidate shall be recorded on the Log Book.
- The Supervisor shall certify every year that the Log Book is being maintained and signed regularly Certificate to be deposited in DME, RMU, duly signed by HOD and Supervisor.
- The Log Book will be developed & approved by the Research Board.
- The evaluation will be maintained by the Supervisor (in consultation with the Co-Supervisor, if appointed).
- The performance of the candidate shall be evaluated on annual basis. The total marks for Log Book shall be 100.The log book shall reflect the performance of the candidate on following parameters:
    - Year wise record of the competence of skills.
    - Year wise record of the assignments.
    - Year wise record of the evaluation regarding attitude & behavior
    - Year wise record of journal club / lectures / presentations / clinic-pathologic conferences attended & / or made by the candidate.

1) Table of Specification of Orthopedics

Table of Specifications

Marks Distribution	Units/Topics	No. of Questions	Eligibility for Exam	Research
WRITTEN & CLINICAL- TOTAL MARKS 750 ***Written- Two papers*** Paper 1 & 2 will comprise 100 MCQs Each (single best answer), 1 mark for each McQ *Written exam should be passed (pass marks=60%) to appear in clinical exam.* **Clinical:** OSCE=150 marks (15 stations 10 Marks each) 5-7 min for each station Short cases- 200 marks (4 cases 50 marks each) 12min each Long case- 100 marks (1 long case) 70 min duration ***Thesis = 100 marks*** Presentation – 30 Marks Discussion- 70 Marks ***Pass percentage=*** ***Accumulative pass percentage is 60% with separate at least 55% in each component (i.e., paper 1,2, OSCE, short cases, long cases)*** ***Written papers should be passed separately.*** ***OSCE must be passed separately.*** ***Short cases and long cases must be passed separately.*** ***Thesis must have 60% score to qualify.***	**Paper I (100 MCQs)**		1. Completion of 5-year training 2. Year One, MTA, Year three Assessment should be passed. 3. All internal and external rotations to be completed. 4. Cumulative score of 75% in Continuous Internal assessments of all training years. 5. No dues certificate.	Thesis should be accepted.
	1 Basic Orthopedics & Principles	10		
	2 Adult Trauma	50		
	3 Arthroplasty	12		
	4 Infections	08		
	5 Neuromuscular Disorders	10		
	6 Spine	10		
	Paper II (100MCQs)			
	7 Hand & Nerve Injuries (Upper Limb)	15		
	8 Foot & Ankle & Nerve Injuries (Lower Limb)	15		
	9 Amputation, Prosthetics and Orthotics	06		
	10 Tumors	14		
	11 Sports Medicine & Pain	15		
	12 Congenital Disorders	15		
	13 Pediatric Trauma	10		
	14 General Affections of Bones & Joints	10		
	Clinical			
	OSCE stations	15		
	Short cases	4		
	Long cases	1		
	Thesis	1		

NOTE: 10% of topics may come from any area

SCHEME FOR OSCE IN THE FINAL TERM ASSESSMENT

- Total number of stations – 15 (All Interactive)
- Time allocation for each station – 5minutes
- Marks allocation for each station – 10marks

2) TABLE OF SPECIFICTION FOR 2ND,3RD,4TH AND FINAL YEAR

Table of Specification (Unit wise)

	Contents	Learning Objectives:	Teaching Strategies	Formative Assessment	Time Allocation	MCQs	OSCE	Assessment %
	Basic Orthopaedics	• Understand the principles and techniques of imaging modalities commonly used in orthopaedics, such as X-ray, MRI, CT scan, and ultrasound. • Identify the indications and limitations of different imaging modalities in the evaluation of musculoskeletal conditions. • Demonstrate knowledge of normal anatomy and anatomical variations encountered in orthopaedic imaging studies. • Recognize and describe common radiographic findings and abnormalities seen on X-ray images in orthopaedics, such as fractures, dislocations, and joint degeneration. • Interpret MRI images of the musculoskeletal system, including evaluation of soft tissues, bones, joints, and spinal structures. • Understand the principles of CT scan and its application in orthopaedics, including assessment of bony structures and complex fractures. • Demonstrate proficiency in recognizing and describing common pathological conditions visualized on orthopaedic imaging studies, such as tumors, infections, and inflammatory diseases. • Identify and interpret ultrasound findings relevant to orthopaedics, including evaluation of tendons, ligaments, and joint effusions. • Understand the role of advanced imaging techniques, such as magnetic resonance arthrography (MRA) and computed tomography arthrography (CTA), in the assessment of joint pathology. • Recognize the importance of appropriate imaging protocol selection, including positioning, sequences, and contrast administration, based on the clinical question and suspected pathology. • Discuss the principles of radiation safety and dose optimization in orthopaedic imaging. • Stay updated with the latest advancements and emerging techniques in orthopaedic imaging, such as functional MRI and molecular imaging. • Understand the role of imaging in preoperative planning, intraoperative guidance, and postoperative assessment of orthopaedic procedures. • Communicate effectively with radiologists and other healthcare professionals in discussing imaging findings and formulating management plans for orthopaedic patients	Seminar, SGD, bedside teaching short case, long case, DOPS MiniCEx	**Log Book WPBA** Multisource feedback 360° Perform a DOPS MiniCEX	**5%**	**10**	**01**	**5%**

Table of Specification (Unit wise)

	Contents	Learning Objectives:	Teaching Strategies	Formative Assessment	Time Allocation	MCQs	OSCE	Assessment %
	Adult Trauma General Principles of Fracture Treatment Fractures of Lower Extremity Fractures of Hip Fractures of Acetabulum And Pelvis Fractures of Shoulder, Arm, and Forearm Malunited Fractures Delayed Union and Nonunion Of Fractures Acute Dislocations Old Unreduced Dislocations Fractures, Dislocations and Ligamentous Injuries of the hand Fractures and Dislocations of Foot Fractures and Dislocations In Children	• Understand the basic principles of bone healing and the classification systems used for fractures in orthopaedics. • identify and describe the different types of fractures and dislocations commonly encountered in orthopaedics. • Recognize the clinical signs and symptoms of fractures and dislocations, including deformity, swelling, and loss of function. • Demonstrate knowledge of the diagnostic modalities used to evaluate fractures and dislocations, such as X-ray, CT scan, and MRI. • Understand the principles of fracture reduction techniques, including closed reduction, open reduction, and percutaneous techniques. • Demonstrate proficiency in the application of various immobilization techniques and devices, such as casts, splints, and external fixators. • Recognize the indications and principles of surgical intervention for fractures and dislocations, including internal fixation, external fixation, and joint reconstruction. • Understand the principles of fracture and soft tissue management in polytrauma patients. • Identify and manage complications associated with fractures and dislocations, such as compartment syndrome, non-union, and malunion. • Discuss the principles of rehabilitation and functional restoration following fractures and dislocations, including physical therapy and occupational therapy. • Stay updated with the latest research and advancements in the management of fractures and dislocations in orthopaedics. • Understand the principles of evidence-based practice in the management of fractures and dislocations. • Recognize the ethical considerations in the management of fractures and dislocations, including informed consent, patient autonomy, and resource allocation. • Communicate effectively with patients and their families, providing information, counseling, and support throughout the diagnosis, treatment, and rehabilitation process.	Seminar, SGD, bedside teaching, short case, long case, DOPS MiniCEx	**Log Book** **WPBA** Multisource feedback 360° Perform a DOPS MiniCEX	**25 %**	**50**	**3**	**25%**

Table of Specification (Unit wise)

	Contents	Learning Objectives:	Teaching Strategies	Formative Assessment	Time Allocation	MCQs	OSCE	Assessment %
	Arthroplasty Arthroplasty of Ankle and Knee Arthroplasty of Hip Arthroplasty of Shoulder and Elbow	1. Understand hip and knee conditions that require arthroplasty surgeries 2. Learn surgical techniques for performing hip and knee arthroplasty surgeries 3. Gain knowledge of patient selection and pre-operative assessment 4. Gain an in-depth understanding of surgical anatomy and biology involved in the procedures. 5. Explore the various types of surgical approaches and their benefits and risks 6. Understand Comprehensively management and prevention of post-operative complications. 7. Learn the necessary skills for post-operative rehabilitation and patient education, along with communication with medical teams and patients. 8. Keep up-to-date and execute necessary changes by occasional review of researches, studies, service updates, and enhancements in the field	Seminar, SGD, bedside teaching, short case, long case, DOPS MiniCEx	**Long Book** **WPBA** Multisource feedback 360° Performa DOPS MiniCEX	**7%**	**12**	**01**	**07%**

Table of Specification (Unit wise)

	Contents	Learning Objectives:	Teaching Strategies	Formative Assessment	Time Allocation	MCQs	OSCE	Assessment %
	Infections • General Principles of Infection • Osteomyelitis • Infectious Arthritis • Tuberculosis and Other Infections	• Understand the basic concepts of infection in orthopaedics, including pathogenesis and host immune response. • Identify the common types of infections encountered in orthopaedics, such as surgical site infections, osteomyelitis, and prosthetic joint infections. • Recognize the risk factors and predisposing conditions for orthopaedic infections, including patient-related factors and surgical factors. • Describe the clinical manifestations and signs of orthopaedic infections, including local signs of inflammation, systemic symptoms, and laboratory markers. • Demonstrate knowledge of the diagnostic modalities used to evaluate orthopaedic infections, such as laboratory tests, imaging studies, and microbiological cultures. • Understand the principles of antimicrobial therapy in orthopaedic infections, including selection of appropriate antibiotics, dosage, and duration of treatment. • Recognize the role of surgical intervention in the management of orthopaedic infections, including debridement, drainage, and implant removal. • Understand the principles of implant-related infections and the challenges associated with their treatment. • Identify the preventive strategies and infection control measures in orthopaedics, including preoperative preparation, aseptic techniques, and prophylactic antibiotic administration. • Recognize and manage complications associated with orthopaedic infections, such as soft tissue necrosis, septic arthritis, and chronic osteomyelitis. • Understand the principles of biofilm formation and its significance in orthopaedic infections. • Discuss the emerging techniques and advancements in the diagnosis and treatment of orthopaedic infections, such as molecular diagnostics and local antibiotic delivery systems. • Understand the principles of multidisciplinary collaboration in the management of orthopaedic infections, including infectious disease specialists and microbiologists. • Discuss ethical considerations in the management of orthopaedic infections, including informed consent, patient autonomy, and resource allocation.	Seminar, SGD, bedside teaching, short case, long case, DOPS MiniCEx	**Log Book** **WPBA** Multi source feedback 360° Perform a DOPS MiniCEX	**06%**	**08**	**1**	**06%**

Table of Specification (Unit wise)

	Contents	Learning Objectives:	Teaching Strategies	Formative Assessment	Time Allocation	MCQs	OSCE	Assessment %
	Neuromuscular Disorders • Osteochondrosis • Rickets and osteomalacia • Metabolic bone disease • Cerebral Palsy • Paralytic Disorders • Neuromuscular Disorders • Genetic disorders • Osteonecrosis	• Understand the etiology, pathophysiology, and natural history of common non-traumatic orthopaedic disorders, such as osteoarthritis, rheumatoid arthritis, and osteoporosis. • Identify the clinical manifestations and signs of non-traumatic orthopaedic disorders, including pain, joint deformities, and functional limitations. • Demonstrate knowledge of the diagnostic modalities used to evaluate non-traumatic orthopaedic disorders, such as imaging studies, laboratory tests, and clinical assessment tools. • Understand the principles of non-surgical management and conservative treatment options for non-traumatic orthopaedic disorders, including pharmacological interventions, physical therapy, and lifestyle modifications. • Recognize the indications and principles of surgical intervention for non-traumatic orthopaedic disorders, including joint replacement surgery, arthroscopy, and corrective osteotomies. • Discuss the principles of multidisciplinary collaboration in the management of non-traumatic orthopaedic disorders, involving orthopaedic surgeons, rheumatologists, physiotherapists, and occupational therapists. • Identify and manage the complications and potential sequelae associated with non-traumatic orthopaedic disorders, such as joint stiffness, muscle weakness, and systemic complications. • Understand the principles of pain management and rehabilitation strategies for individuals with non-traumatic orthopaedic disorders. • Recognize the importance of patient education and counseling in non-traumatic orthopaedic disorders, including lifestyle modifications, medication compliance, and self-management strategies. • Stay updated with the latest research and advancements in the diagnosis and treatment of non-traumatic orthopaedic disorders. • Understand the principles of evidence-based practice in the management of non-traumatic orthopaedic disorders. • Recognize the ethical considerations in the management of non-traumatic orthopaedic disorders, including informed consent, patient autonomy, and shared decision-making. • Communicate effectively with patients and their families, providing information, counseling, and support throughout the diagnosis, treatment, and rehabilitation process. Collaborate with other healthcare professionals to optimize the overall care and outcomes of patients with non-traumatic orthopaedic disorders.	Seminar, SGD, bedside teaching, short case, long case, DOPS MiniCEx	**Log Book** **WPBA** Multisource feedback 360° Performa DOPS MiniCEX	**06%**	**10**	**01**	**6%**

Table of Specification (Unit wise)

	Contents	Learning Objectives:	Teaching Strategies	Formative Assessment	Time Allocation	MCQs	OSCE	Assessment %
	Spine • Spinal Anatomy And Surgical Approaches • Fractures, Dislocations, And Fracture-Dislocations Of Spine • Arthrodesis Of Spine • Pediatric Cervical Spine • Scoliosis And Kyphosis • Lower Back Pain And Disorders Of Intervertebral Discs • Infections Of Spine	• Understanding Spinal Anatomy: Students should be able to identify and describe the different structures of the spine, including vertebrae, discs, ligaments, and spinal cord. • Exploring Spinal Conditions: Students should gain knowledge about common spinal conditions such as herniated discs, spinal stenosis, scoliosis, and degenerative disc disease. They should understand the causes, symptoms, and available treatment options for each condition. • Examining Diagnostic Techniques: Students should learn about various diagnostic techniques used in evaluating spinal disorders, such as X-rays, MRI scans, CT scans, and physical examinations. They should understand the indications and limitations of each diagnostic method. • Understanding Spinal Biomechanics: Students should grasp the principles of spinal biomechanics, including spinal motion, load distribution, and the influence of posture on spinal health. • Recognizing Red Flags and Emergency Situations: Students should be able to identify red flags and warning signs that indicate a potential serious spinal condition requiring immediate medical attention. • Familiarizing with Conservative Treatment Approaches: Students should gain knowledge about conservative treatment options for spinal disorders, including physical therapy, pain management, and non-surgical interventions. • Introducing Surgical Interventions: Students should understand when surgical intervention is appropriate for spinal conditions and be familiar with common surgical procedures, such as discectomy, laminectomy, and spinal fusion. • Discussing Rehabilitation and Recovery: Students should learn about postoperative care, rehabilitation exercises, and strategies for promoting recovery and preventing future spinal problems. • Considering Minimally Invasive Techniques: Students should be introduced to minimally invasive surgical techniques used in spine surgery, understanding their advantages and potential limitations compared to traditional open surgery. • Exploring Emerging Technologies: Students should be aware of emerging technologies and innovations in the field of spine care, such as robotic-assisted surgery, artificial disc replacement, and regenerative medicine.	Seminar, SGD, bedside teaching, short case, long case, DOPS MiniCEx	**Log Book** **WPBA** Multisource feedback 360° Performa DOPS MiniCEX	**06%**	**10**	**01**	**6%**

Table of Specification (Unit wise)

	Contents	Learning Objectives:	Teaching Strategies	Formative Assessment	Time Allocation	MCQs	OSCE	Assessment %
	Hand & Peripheral Nerve Injuries Diagnosis and management	• Understand the anatomy and physiology of peripheral nerves in the context of orthopaedics. • Identify the different types and causes of peripheral nerve injuries in orthopaedics, including traumatic injuries, compression neuropathies, and nerve entrapments. • Recognize the clinical manifestations and signs of peripheral nerve injuries, such as sensory deficits, motor weakness, and altered reflexes. • Demonstrate knowledge of the diagnostic modalities used to evaluate peripheral nerve injuries, such as physical examination techniques, nerve conduction studies, and imaging studies. • Understand the principles of nerve regeneration and recovery following peripheral nerve injuries. • Identify and describe common peripheral nerve injuries encountered in orthopaedics, such as carpal tunnel syndrome, radial nerve palsy, and brachial plexus injuries. • Recognize the indications and principles of surgical intervention for peripheral nerve injuries, including nerve repair, nerve grafting, and nerve transfers. • Understand the principles of conservative management and rehabilitation strategies for peripheral nerve injuries, such as physical therapy and occupational therapy. • Recognize and manage complications and sequelae associated with peripheral nerve injuries, including muscle atrophy, contractures, and neuropathic pain. • Discuss the latest advancements and emerging techniques in the diagnosis and treatment of peripheral nerve injuries in orthopaedics, such as nerve conduits and nerve transfers. • Understand the principles of multidisciplinary collaboration in the management of peripheral nerve injuries, involving orthopaedic surgeons, neurologists, and rehabilitation specialists. • Recognize the ethical considerations in the management of peripheral nerve injuries, including informed consent, patient autonomy, and resource allocation. • Stay updated with the latest research and advancements in the field of peripheral nerve injuries in orthopaedics. • Communicate effectively with patients and their families, providing information, counseling, and support throughout the diagnosis, treatment, and rehabilitation process.	Seminar, SGD, bedside teaching, short case, long case, DOPS MiniCEx	**Log Book** **WPBA** Multisource feedback 360° Performa DOPS MiniCEX	**7%**	**15**	**1**	**7%**

Table of Specification (Unit wise)

	Contents	Learning Objectives:	Teaching Strategies	Formative Assessment	Time Allocation	MCQs	OSCE	Assessment %
	The Foot and Ankle • Surgical Techniques • Disorders of Hallux • PesPlanus • Lesser Toe Abnormalities • Rheumatoid Foot • Diabetic Foot • Neurogenic Disorders Disorders of Nails and Skin Disorders of Tendons and Fascia	• Understanding Foot and Ankle Anatomy: Students should be able to identify and describe the bones, joints, ligaments, muscles, and tendons of the foot and ankle. • Exploring Common Foot and Ankle Conditions: Students should gain knowledge about common foot and ankle conditions, such as plantar fasciitis, Achilles tendonitis, ankle sprains, bunions, and flat feet. They should understand the causes, symptoms, and available treatment options for each condition. • Examining Diagnostic Techniques: Students should learn about various diagnostic techniques used in evaluating foot and ankle disorders, such as physical examinations, X-rays, MRI scans, and gait analysis. They should understand the indications and limitations of each diagnostic method. • Understanding Foot and Ankle Biomechanics: Students should grasp the principles of foot and ankle biomechanics, including gait analysis, foot function, and the relationship between foot mechanics and lower extremity problems. • Recognizing Red Flags and Emergency Situations: Students should be able to identify red flags and warning signs that indicate a potential serious foot or ankle condition requiring immediate medical attention. • Familiarizing with Conservative Treatment Approaches: Students should gain knowledge about conservative treatment options for foot and ankle disorders, including rest, physical therapy, orthotics, medication, and bracing. • Introducing Surgical Interventions: Students should understand when surgical intervention is appropriate for foot and ankle conditions and be familiar with common surgical procedures, such as bunionectomy, ankle arthroscopy, and Achilles tendon repair. • Discussing Rehabilitation and Recovery: Students should learn about postoperative care, rehabilitation exercises, and strategies for promoting recovery and restoring function in the foot and ankle. • Considering Footwear and Orthotics: Students should understand the importance of proper footwear selection and the use of orthotics in managing foot and ankle conditions. • • Exploring Emerging Technologies: Students should be aware of emerging technologies and innovations in the field of foot and ankle care, such as minimally invasive procedures, regenerative medicine, and advanced imaging techniques.	Seminar, SGD, bedside teaching, short case, long case, DOPS MiniCEx	**Log Book** **WPBA** Multisource feedback 360° Performa DOPS MiniCEX	**7%**	**15**	**1**	**7%**

Table of Specification (Unit wise)

	Contents	Learning Objectives:	Teaching Strategies	Formative Assessment	Time Allocation	MCQs	OSCE	Assessment %
	Amputations • General Principles of Amputations • Amputations about Foot • Amputations of Lower Extremity • Amputations of Hip And Pelvis • Amputations of Upper Extremity • Amputations of Hand	• Understand the indications and different types of amputations, ranging from finger to limb. • Learn pre-operative evaluation, selection of patients best suited for amputation, and relevant assessment tools. • Develop skills and knowledge in surgical approaches and techniques for performing amputations. • Acquire appropriate knowledge of complications specific to amputations and their monitoring and management. • Understand the prosthetics, assistive devices, and rehabilitation plan selection and how they enhance a patient's functional outcomes and quality of life after amputation. • Develop expert collaboration skills, advocate, and ensure patient is referred to the right multidisciplinary management team involving psychologic and physiologic rehabilitation. • Learn to be empathic, communicative, and professional with amputated patients throughout the treatment process. • Keep up-to-date by reviewing the latest technological advancements and research in the field of amputations to ensure quality patient care delivery.	Seminar, SGD, bedside teaching, short case, long case, DOPS MiniCEx	**Log Book** **WPBA** Multisource feedback 360° Perform a DOPS MiniCEX	**01%**	**6**	**0**	**01%**

Table of Specification (Unit wise)

	Contents	Learning Objectives:	Teaching Strategies	Formative Assessment	Time Allocation	MCQs	OSCE	Assessment %
	Tumors • General Principles of Tumors • Benign Tumors of Bone • Malignant Tumors of Bone Soft Tissue Tumors and Non-neoplastic Conditions Simulating Bone Tumors	• Understand the different types of orthopaedic tumors, including primary and metastatic tumors. • Identify the clinical manifestations and signs of orthopaedic tumors, including pain, swelling, and deformities. • Recognize the risk factors and predisposing conditions for the development of orthopaedic tumors. • Describe the principles of tumor staging and grading in orthopaedics. • Demonstrate knowledge of the diagnostic modalities used to evaluate orthopaedic tumors, such as imaging studies (X-ray, MRI, CT scan) and biopsy techniques. • Understand the principles of surgical management of orthopaedic tumors, including tumor resection, limb-sparing surgery, and reconstruction. • Identify the indications and contraindications for adjuvant therapies in orthopaedic tumor management, such as radiation therapy or chemotherapy. • Recognize the complications and potential sequelae associated with orthopaedic tumor treatment, including infection, implant failure, and functional limitations. • Understand the principles of surveillance and long-term follow-up for patients with orthopaedic tumors. • Discuss the principles of multidisciplinary collaboration in the management of orthopaedic tumors, involving orthopaedic surgeons, oncologists, radiologists, and pathologists. • Understand the emerging techniques and advancements in the diagnosis and treatment of orthopaedic tumors, such as targeted therapies and immunotherapy. • Recognize the ethical considerations in the management of orthopaedic tumors, including informed consent, patient autonomy, and end-of-life care. • Stay updated with the latest research and advancements in orthopaedic tumor management. • Communicate effectively with patients and their families, providing information and support throughout the diagnosis, treatment, and follow-up process.	Seminar, SGD, bedside teaching, short case, long case, DOPS MiniCEx	**Log Book** **WPBA** Multisource feedback 360° Perform a DOPS MiniCEX	**07%**	**14**	**01**	**07%**

Table of Specification (Unit wise)

	Contents	Learning Objectives:	Teaching Strategies	Formative Assessment	Time Allocation	MCQs	OSCE	Assessment %
	Sports Medicine • Ankle Injuries • Knee Injuries • Shoulder And Elbow Injuries Recurrent Dislocations	• 1 Identify and describe common ankle injuries encountered in sports medicine, such as sprains, strains, fractures, and ligamentous tears. • Understand the anatomy and biomechanics of the ankle joint in the context of sports-related injuries. • Recognize the clinical signs and symptoms of ankle injuries, including pain, swelling, instability, and functional limitations. • Demonstrate proficiency in conducting a thorough physical examination of the ankle, including stress testing and special maneuvers. • Understand the principles of imaging modalities used in the evaluation of ankle injuries, such as X-ray, MRI, and ultrasound. • Discuss the principles of non-surgical management and conservative treatment options for ankle injuries, including rehabilitation protocols, bracing, and functional support. • Identify and describe surgical interventions used in the management of complex ankle injuries, such as ligament reconstruction and fracture fixation. • Understand the principles of rehabilitation and return-to-sport guidelines for ankle injuries, including progressive strengthening, proprioceptive training, and sport-specific exercises. • Recognize the potential complications and long-term consequences associated with ankle injuries, such as chronic instability, osteoarthritis, and post-traumatic conditions. • Stay updated with the latest research and advancements in the diagnosis, treatment, and prevention of ankle injuries in sports medicine.	Seminar, SGD, bedside teaching, short case, long case, DOPS MiniCEx	**Log Book** **WPBA** Multisource feedback 360° Perform a DOPS MiniCEX	**6%**	**15**	**1**	**6%**

Table of Specification (Unit wise)

	Contents	Learning Objectives:	Teaching Strategies	Formative Assessment	Time Allocation	MCQs	Time Allocation OSCE	Assessment %
	Congenital Anomalies • Congenital Anomalies of Lower Extremity • Congenital and Developmental Anomalies Of Hip and Pelvis • Congenital Anomalies of Trunk and Upper Extremity	• Understand the etiology and genetic basis of congenital anomalies in orthopaedics. • Identify and describe common congenital anomalies in orthopaedics, such as clubfoot, congenital hip dysplasia, and limb length discrepancies. • Recognize the clinical manifestations and signs of congenital anomalies, including physical deformities and functional impairments. • Demonstrate knowledge of the diagnostic modalities used to evaluate congenital anomalies, such as physical examination techniques, imaging studies, and genetic testing. • Understand the principles of non-surgical management and conservative treatment options for congenital anomalies, such as bracing, casting, and physical therapy. • Identify the indications and principles of surgical intervention for congenital anomalies, including corrective procedures and limb reconstruction. • Recognize the potential complications and long-term sequelae associated with congenital anomalies and their management. • Understand the importance of early intervention and multidisciplinary collaboration in the management of congenital anomalies. • Discuss the psychosocial and emotional impact of congenital anomalies on patients and their families. • Understand the principles of prosthetic and orthotic interventions for individuals with congenital anomalies. • Recognize the ethical considerations in the management of congenital anomalies, including informed consent, patient autonomy, and resource allocation. • Stay updated with the latest research and advancements in the diagnosis and treatment of congenital anomalies in orthopaedics. • Communicate effectively with patients and their families, providing information, counseling, and support throughout the diagnosis, treatment, and follow-up process. • Collaborate with other healthcare professionals to optimize the overall care and outcomes of patients with congenital anomalies.	Seminar, SGD, bedside teaching, short case, long case, DOPS MiniCEx	**Log Book** **WPBA** Multisource feedback 360° Perform a DOPS MiniCEX	**7%**	**15**	**1**	**7%**

Table of Specification (Unit wise)

	Contents	Learning Objectives:	Teaching Strategies	Formative Assessment	Time Allocation	MCQs	Time Allocation OSCE	Assessment %
	Paediatric Trauma	• Understand the unique anatomical and physiological considerations in paediatric patients that affect the management of trauma. • Identify and describe the common types of paediatric traumatic injuries, including fractures, soft tissue injuries, head injuries, and abdominal injuries. • Recognize the clinical signs and symptoms of paediatric traumatic injuries, including pain, swelling, deformity, altered mental status, and signs of internal bleeding. • Discuss the principles of diagnostic modalities used in the evaluation of paediatric traumatic injuries, such as x-ray, ct scan, ultrasound, and mri. • Identify and describe the specific management strategies for paediatric fractures and dislocations, including closed reduction, immobilization techniques, and surgical interventions. • Understand the principles of head injury management in paediatric trauma, including assessment of concussion, monitoring for raised intracranial pressure, and appropriate referral for neurosurgical intervention. • Recognize the signs and symptoms of child abuse and neglect in the context of paediatric trauma, and understand the appropriate reporting and referral processes. • Understand the principles of rehabilitation and functional restoration in paediatric trauma patients, including physical therapy and occupational therapy. • Recognize the potential long-term consequences and complications of paediatric trauma, such as growth disturbances, developmental delays, and psychosocial sequelae. • Stay updated with the latest research and advancements in the management of paediatric trauma. • Understand the principles of family-centered care and effective communication with parents/guardians in the context of paediatric trauma.	Seminar, SGD, bedside teaching, short case, long case, DOPS MiniCEx	**Log Book** **WPBA** Multisource feedback 360° Performa DOPS MiniCEX	**6%**	**10**	**1**	**6%**

Table of Specification (Unit wise)

	Contents	Learning Objectives:	Teaching Strategies	Formative Assessment	Time Allocation	MCQs	Time Allocation OSCE	Assessment %
	Affection of Bones and Joints	• Understand the anatomy and physiology of bones and joints, including their structure, function, and biomechanics. • Identify and describe common diseases and conditions that affect bones and joints, such as osteoarthritis, rheumatoid arthritis, osteoporosis, fractures, and joint infections. • Recognize the risk factors, etiology, and pathophysiology associated with various bone and joint disorders. • Discuss the clinical signs and symptoms of bone and joint diseases, including pain, swelling, stiffness, limited range of motion, deformity, and functional limitations. • Demonstrate proficiency in conducting a thorough physical examination of the musculoskeletal system, including joint assessment, range of motion testing, and functional evaluation. • Understand the principles of diagnostic modalities used in the evaluation of bone and joint diseases, including imaging studies (e.g., X-ray, MRI, CT scan), laboratory tests, and joint aspiration. • Identify and describe non-surgical treatment options for bone and joint diseases, including pharmacological interventions, physical therapy, occupational therapy, assistive devices, and lifestyle modifications. • Understand the principles of surgical management for specific bone and joint disorders, including joint replacement procedures, arthroscopy, fracture fixation, and corrective osteotomies. • Recognize the potential complications and long-term consequences associated with bone and joint diseases, such as joint stiffness, deformities, disability, and decreased quality of life. • Stay updated with the latest research, evidence-based guidelines, and advancements in the diagnosis, treatment, and management of bone and joint disorders. • Understand the principles of multidisciplinary care and the importance of collaboration with other healthcare professionals, such as rheumatologists, physiotherapists, radiologists, and pain management specialists. • Discuss the psychosocial impact of bone and joint disorders on patients' well-being, including the importance of patient education, psychological support, and lifestyle modifications. • Recognize the ethical considerations and challenges in the management of bone and joint diseases, including patient autonomy, informed consent, resource allocation, and end-of-life care.	Seminar, SGD, bedside teaching, short case, long case, DOPS MiniCEx	**Log Book** **WPBA** Multisource feedback 360° Perform a DOPS MiniCEX	**06%**	**10**	**1**	**06%**

4) TOPIC WISE DISTRIBUTION OF OSCE STATIONS

SNO	TOPICS	STATION WISE DISTRIBUTION
01	**PROCEDURE** **ADULT TRAUMA**	this station focuses on the assessment and management of adult trauma cases. it may involve evaluating and treating fractures, dislocations, or other traumatic injuries in adult patients. candidates may be asked to demonstrate their knowledge of surgical techniques, such as, application of skeletal traction and pop application, manipulation for fractures. Dislocations, (hip, elbow, shoulder). biopsy techniques trucut biopsy, joint aspiration, external fixator application tendon repair technique skin suture
02	**IMPLANTS** **ADULT TRAUMA**	this station continues to assess the candidate's proficiency in managing adult trauma cases. it may involve scenarios where candidates need to apply their knowledge of implant selection and placement for fractures or other trauma-related conditions. screw, all sizes bits esp 3.5mm, 4.5mm , 5.00 mm, skill stations, principal of lag screw, gadgets required (saw bone, drill with sleeve, screws drivers with gauge) dhs \dcs, implant identification, principles of dhs, angles, mechanism, indication of dhs, pros and cons of implant nails, types (identification), pfn, export fixable nail, normal tibial nail, mode of nailing, reaming of im cavity, working length of nail , plates, identification of implants, locking/ narrow / broad, mode , buttressing screws weight beaning, compression, tension, weight shearing, bridging, implants spinal implants external \internal fixators
03	**RADIOLOGY** **ADULT TRAUMA**	this station continues to assess the candidate's proficiency in managing adult trauma cases eg mri ct scan x rays bone scan ncs emg clinical scenario
04	**RADIOLOGY /INSTRUMENTS** **ARTHROPLASTY:**	arthroplasty station: this station evaluates the candidate's understanding and skills related to joint replacement procedures. candidates may be asked to demonstrate their knowledge of implant selection, surgical techniques, and post-operative care for arthroplasty cases. clinical scenarios, along with clinical pictures, imaging studies (mri, ct scan, x-rays, bone scan, ncs, emg), may be provided to assess the candidate's decision-making abilities. candidates may also need to demonstrate their understanding of arthroplasty implants and their appropriate use. instruments may be used like (total hip replacement / total knee replacement) names, uses with sequence techniques. (saw bone models of pelvis ,knee ,shoulder)

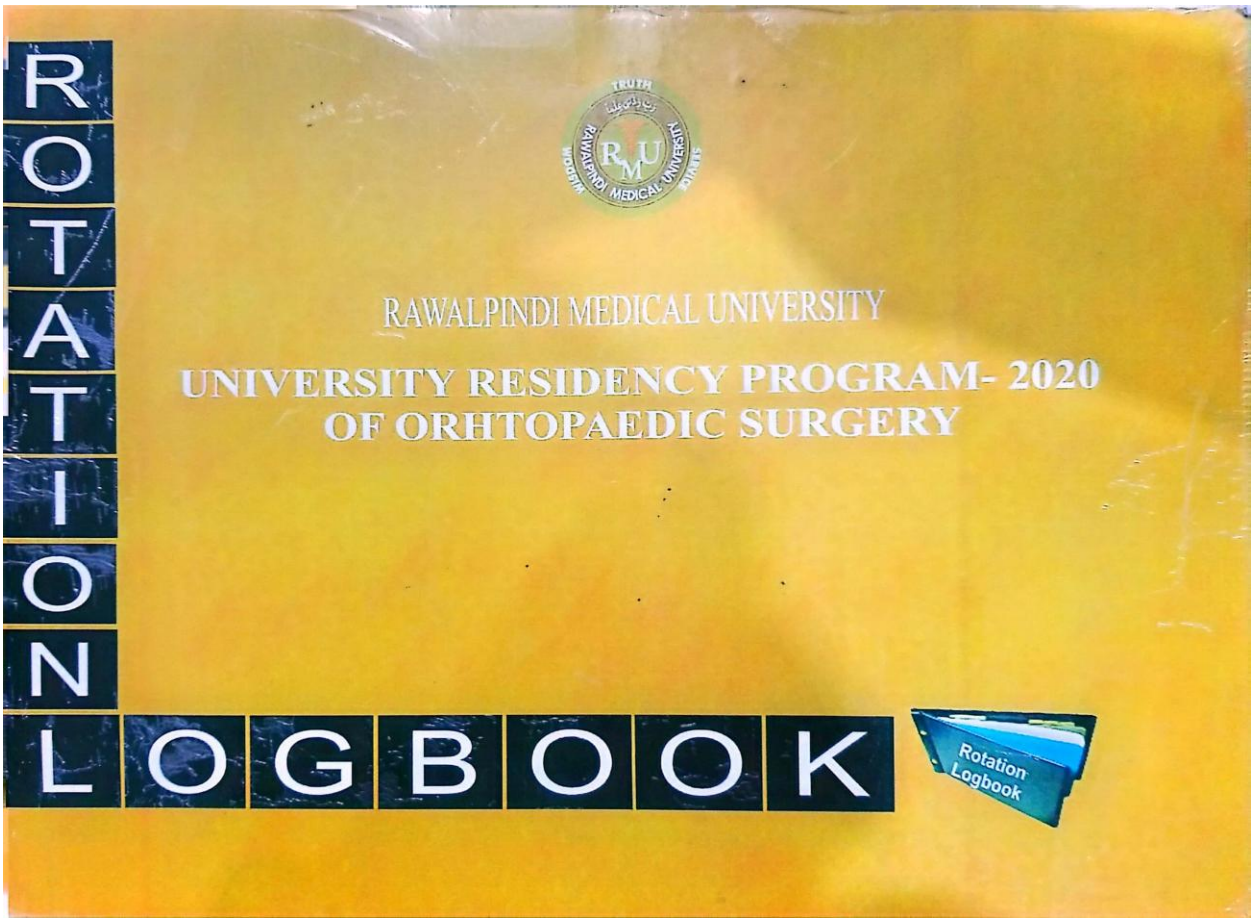
05	**RADIOLOGY INFECTIONS:**	this station assesses the candidate's knowledge and approach to managing orthopedic infections. clinical scenarios, clinical pictures and imaging studies (mri, ct scan, x-rays, bone scan, ncs, emg) may be presented. candidates may be asked to diagnose and develop treatment plans for various orthopedic infections, as well as demonstrate procedural skills such as joint aspiration.
06	**PATIENT\INVESTIGATIONS NEUROMUSCULAR DISORDERS**	neuromuscular disorders station: this station focuses on the evaluation and management of orthopedic conditions related to neuromuscular disorders. candidates may encounter patient, clinical scenarios, clinical pictures, and imaging studies (mri, ct scan, x-rays, bone scan, ncs, emg) that require them to assess and develop treatment plans for patients with neuromuscular disorders affecting the musculoskeletal system.
07	**RADIOLOGY/IMPLANT SPINE:**	this station evaluates the candidate's knowledge and skills related to spine disorders and conditions. candidates may encounter clinical scenarios, clinical pictures, and imaging studies (mri, ct scan, x-rays, bone scan, ncs, emg) requiring them to assess and manage spinal disorders, including surgical intervention. candidates may also need to demonstrate their understanding of spinal implants and their appropriate use.
08	**RADIOLOGY** **HAND & NERVE INJURIES (UPPER LIMB):**	this station assesses the candidate's proficiency in evaluating and managing hand and upper limb injuries. clinical scenarios, clinical pictures, and imaging studies (mri, ct scan, x-rays, bone scan, ncs, emg) may be provided to evaluate the candidate's decision-making abilities. some examples for radiology are as under kenibocks disease 2. tran scaphoid peri lunate dislocation 3. radial club hand 4. visi, disi examples of clinical video/picture : dupuytrens contracture, volkmann ischemic contracture (vic), radial club hand
09	**IMPLANTS/ ORTHOSIS/PROSTHESIS FOOT & ANKLE & NERVE INJURIES (LOWER LIMB):**	this station focuses on the evaluation and management of orthopedic ailments and the use of implants used in foot surgery / orthosis/prosthesis afo, ptb orthosis, kafo, hkafo, bk prothesis, [e.g. upper and lower limb prothesis, hip abduction brace, who, fracture humerus brace fracture tibia brace, sach foot, cervical orthosis, scoliosis braces, hip abduction brace, ddh club foot braces, db splint
10	**RADIOLOGY TUMORS**	this station focuses on the evaluation and management of orthopedic tumors. candidates may encounter clinical scenarios, clinical pictures, and imaging studies (mri, ct scan, x rays)
11	**INSTRUMENTS \VIDEO\MRI SPORTS MEDICINE PAIN]**	this station focuses on the evaluation and management of sports injuries. candidates may encounter clinical scenarios, clinical pictures, and imaging studies (mri, ct scan, x rays) 1instruments on station — viva related to use and markings on knee model

		2- mri knee / shoulder — describe and then viva related to finding. 3- video of arthroscopy — identify structures and findings.
12	**PATIENT/RADIOLOGY [CONGENITAL DISORDERS]**	THIS STATION FOCUSES ON THE EVALUATION AND MANAGEMENT OF ORTHOPEDIC CONGENITAL DISORDERS. CANDIDATES MAY ENCOUNTER PATIENT, CLINICAL SCENARIOS, CLINICAL PICTURES, AND IMAGING STUDIES (MRI, CT SCAN, X RAYS, DD H LCPD CVT CTEV PROXIMAL FEMORAL FOCAL DEFICIENCY TIBIA HEMIALGIA AMPHIARTHROSIS TIBIA / FIBULA RICKETS RADIAL CLUBFOOT RICKETS
13	**RADIOLOGY [PAEDIATRIC TRAUMA]**	THIS STATION FOCUSES ON THE EVALUATION AND MANAGEMENT OF PEDIATRIC TRAUMA, CANDIDATES MAY ENCOUNTER CLINICAL SCENARIOS, CLINICAL PICTURES, AND IMAGING STUDIES (MRI, CT SCAN, X RAYS, EXAMPLES OF RADIOLOGY STATIONS MAY BE FRACTURE HUMERUS SALTER HARRIS TYPES HIP FRACTURE / RADIUS SLIPPED CAPITAL HIP DISLOCATION ELBOW DISLOCATION PICTURES CUBITUS VARUS / VALGUS – GENU VALGUM / VARUS
14	**PATIENT GENERAL AFFECTIONS OF BONES & JOINTS**	THIS STATION FOCUSES ON THE EVALUATION AND MANAGEMENT OF PATIENTS WITH PARALYTIC DISORDERS, OSTEOCHONDROSIS, APOPHYSITIS, JOINT DISORDERS AND DEFORMITIES EG .EXAM OF KNEE JOINT OF PATIENT WITH OA,JOINT EXAM OF RHEUMATOID ARTHRITIS
15	**INSTRUMENTS / (SAW BONE MAY BE USED BASIC ORTHOPAEDICS & PRINCIPLES**	> THIS STATION FOCUSES ON THE APPLICATION OF ORTHOPEDIC PRINCIPLES IN DIFFERENT PROCEDURES LIKE 1-LAG SCREW ETC 2-NEUTRALIZATION PLATE ETC 3-DCP ETC 4-PELVIS FRACTURE ETC 5-ANKLE FRACTURE ETC 6- SKELETAL TRACTION ETC 7-LATERAL HIP SKELETAL TRACTION ETC

NOTE: 10% of topics may come from any area

SECTION VII Logbook

LOG BOOK

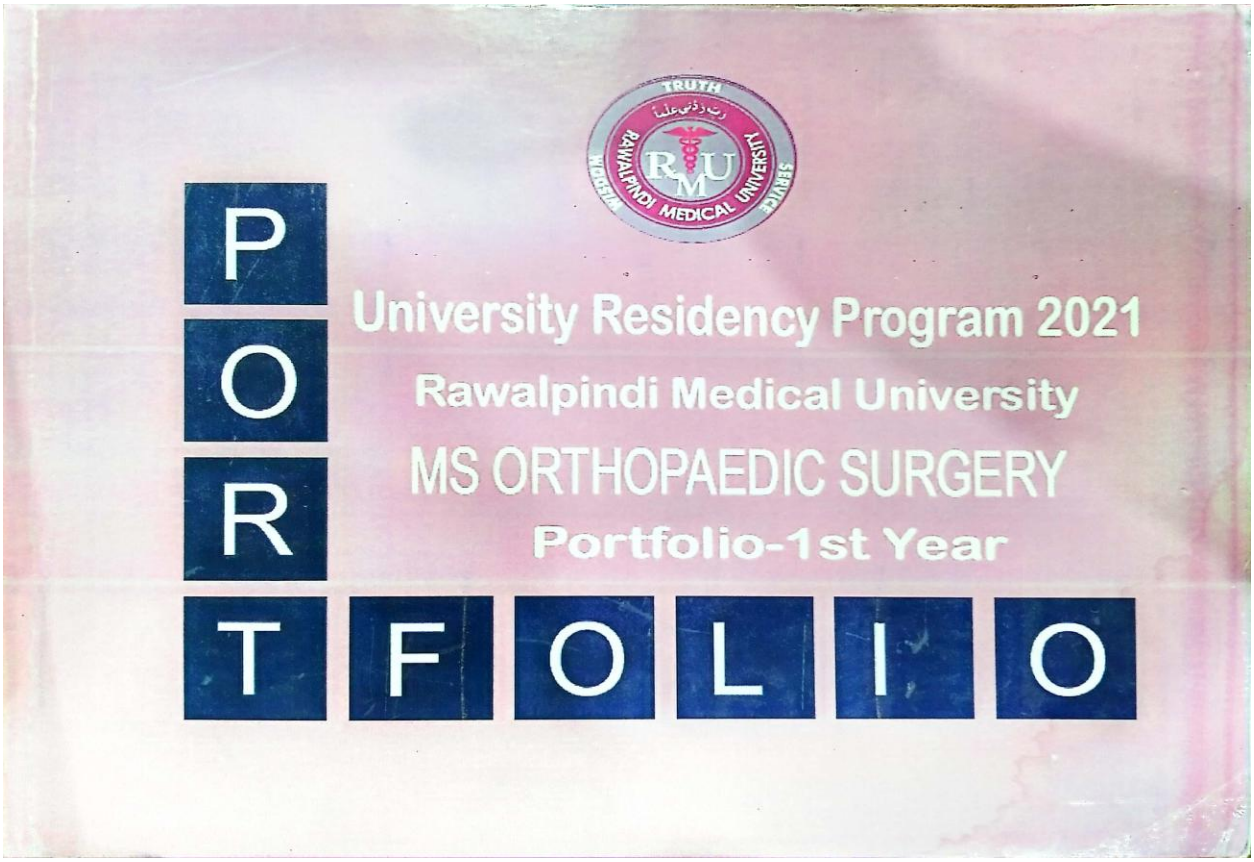


QR CODE OF LOG BOOK

ORTHO.L

SECTION VIII PORTFOLIO

PORTFOLIO



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ORTHO.L

SECTION IX References

CORE BOOKS

- Apley's System of Orthopaedics& Fractures
- Campbell's Operative Orthopaedics
- Mercer's Orthopaedic Surgery
- Mc Rae – Clinical Examination
- Hamilton Bailey Demonstration of Clinical Signs & Symptoms
- Snell's Anatomy
- Pye's Surgical Handicraft
- Stewart's Manual

REFERENCE BOOKS

- Rockwood & Green – Fractures in Adults
- Rockwood & Green – Fractures in Children
- Chapman Orthopaedic Surgery
- Turek's Textbook of Orthopaedics
- Hoppenfield – Surgical Exposures
- Mc Rae – Surgical Exposures
- Insall& Scott – Surgery of the Knee
- Miller & Cole Textbook of Arthroscopy
- Tachdjian Paediatric Orthopaedics

Section X Appendices

360 EVALUATION, EVALUATION OF TRAINEES BY NURSING STAFF REGARDING CORE COMPETENCIES, WPBA, ANNUAL REPORT, EVALUATION OF FACULTY BY RESIDENT, PROGRAM EVALUATION

ANNUAL PROGRAM EVALUATION (APE)

MINUTES& ACTION PLAN

Date of the APE meeting:

Date; Minutes &Action Plan were reviewed and Approved by teaching faculty:

Please attach the minutes of the meeting where the Minutes &Action Plan were reviewed and approved.

Academic Year reviewed:

Faculty Members of the PEC in attendance

Other Members of the PEC in attendance:

Areas reviewed:

1. Resident performance
    - Supporting documents:
2. Faculty development
    - Supporting documents:
3. Graduate performance
    - Supporting documents:
4. Program quality
    - Supporting documents:
5. Policies, Protocols &Procedures
    - Supporting documents:

Appendices Documents.

1

RAWALPINDI MEDICAL UNIVERSITY

MENTOR / SUPERVISOR EVALUATION OF TRAINEE

Resident's Name: _____

Evaluator's Name(s): _____

Hospital Name: _____

Date of Evaluation: _____

☐ Traditional Track (10% Clinic) ☐ Primary Care Track (20% Clinic)

1	Unsatisfactory
2	Below Average
3	Average
4	Good
5	Superior

Please circle the appropriate number for each item using the scale above.

Patient Care	Scale				
1. Demonstrates sound clinical judgment	1	2	3	4	5
2. Presents patient information case concisely without significant omissions or digressions	1	2	3	4	5
3. Able to integrate the history and physical findings with the clinical data and identify all of the patient's major problems using a logical thought process	1	2	3	4	5
4. Develops a logical sequence in planning for diagnostic tests and procedures and Formulates an appropriate treatment plan to deal with the patient's major problems	1	2	3	4	5
5. Able to perform commonly used office procedures	1	2	3	4	5
6. Follows age appropriate preventative medicine guidelines in patient care	1	2	3	4	5
Medical Knowledge	**Scale**				
1. Uses current terminology	1	2	3	4	5
2. Understands the meaning of the patient's abnormal findings	1	2	3	4	5
3. Utilizes the appropriate techniques of physical examination	1	2	3	4	5
4. Develops a pertinent and appropriate differential diagnosis for each patient	1	2	3	4	5
5. Demonstrates a solid base of knowledge of ambulatory medicine	1	2	3	4	5
6. Can discuss and apply the applicable basic and clinically supportive sciences	1	2	3	4	5
Professionalism	**Scale**				
1. Demonstrates consideration for the patient' s comfort and modesty	1	2	3	4	5
2. Arrives to clinic on time and follows clinic policies and procedures	1	2	3	4	5
3. Works effectively with clinic staff and other health professionals	1	2	3	4	5
4. Able to gain the patient's cooperation and respect	1	2	3	4	5
5. Demonstrates compassion and empathy for the patient	1	2	3	4	5
6. Demonstrates sensitivity to patient's culture, age, gender, and disabilities	1	2	3	4	5
7. Discusses end-of-life issues (DPOA, advanced directives, etc.) when appropriate	1	2	3	4	5

1

RAWALPINDI MEDICAL UNIVERSITY

Interpersonal and Communication Skills	Scale				
1. Demonstrates appropriate patient/physician relationship	1	2	3	4	5
2. Uses appropriate and understandable layman's terminology in discussions with patients	1	2	3	4	5
3. Patient care documentation is complete, legible, and submitted in timely manner	1	2	3	4	5
4. Recognizes need for behavioral health services and understands resources available	1	2	3	4	5
Systems-based Practice	**Scale**				
1. Spends appropriate time with patient for the complexity of the problem	1	2	3	4	5
2. Able to discuss the costs, risks and benefits of clinical data and therapy	1	2	3	4	5
3. Recognizes the personal, financial, and health system resources required to carry out the prescribed care plan	1	2	3	4	5
4. Demonstrates effective coordination of care with other health professionals	1	2	3	4	5
5. Recognizes the patient's barriers to compliance with treatment plan such as age, gender, ethnicity, socioeconomic status, intelligence, dementia, etc.	1	2	3	4	5
6. Demonstrates knowledge of risk management issues associated with patient's case	1	2	3	4	5
7. Works effectively with other residents in clinic as if a member of a group practice	1	2	3	4	5
Practice-Based Learning and Improvement	**Scale**				
1. Locates, appraises, and assimilates evidence from scientific studies	1	2	3	4	5
2. Apply knowledge of study designs and statistical methods to the appraisal of clinical studies to assess diagnostic and therapeutic effectiveness of treatment plan	1	2	3	4	5
3. Uses information technology to access information to support diagnosis and treatment	1	2	3	4	5

Comments

Total Score _____/165

_____ _____ _____ _____

Resident's Signature **Date** **Evaluator's Signature** **Date**

2

RAWALPINDI MEDICAL UNIVERSITY

Patient Medical Record / Chart Evaluation Proforma

Name of Resident

Location of Care or Interaction
(OPD/Ward/Emergency/Endoscopy Department)

S#		Poor	Fair	Good	V. Good	Excellent
1.	Basic Data on Front Page Recorded	O	O	O	O	O
2.	Presenting Complaints written in chronological order	O	O	O	O	O
3.	Presenting Complaints Evaluation Done	O	O	O	O	O
4.	Systemic review Documented	O	O	O	O	O
5.	All Components of History Documented	O	O	O	O	O
6.	Complete General Physical Examination done	O	O	O	O	O
7.	Examination of all systems documented	O	O	O	O	O
8.	Differential Diagnosis framed	O	O	O	O	O
9.	Relevant and required investigations documented	O	O	O	O	O
10.	Management Plan framed	O	O	O	O	O
11.	Notes are properly written and eligible	O	O	O	O	O
12.	Progress notes written in organized manner	O	O	O	O	O
13.	Daily progress is written	O	O	O	O	O
14.	Chart is organized no loose paper	O	O	O	O	O
15.	Investigations properly pasted	O	O	O	O	O
16.	Abnormal findings in investigations encircled.	O	O	O	O	O
17.	Procedures done on patient documented properly	O	O	O	O	O
18.	Medicine written in capital letter	O	O	O	O	O
19.	I/v fluids orders are proper with rate of infusion mentioned	O	O	O	O	O
20.	All columns of chart complete	O	O	O	O	O

Poor: 0, Fair: 1, Good: 2, V.Good: 3, Excellent: 4

RAWALPINDI MEDICAL UNIVERSITY

3

Preview Form

RESIDENT EVALUATION BY NURSE / STAFF

Please take a few minutes to complete this evaluation form. All information is confidential and will be used constructively. You need not answer all the questions

Name of Resident*

Location of care or interaction: *(OPD/Ward/Emergency/Endoscopy Department)*

Your position (Nurse, Ward Servant, Endoscopy Attendant)

S#	PROFESSIONALISM	Poor	Fair	Good	V Good	Excellent	Insufficient Contact
1.	Resident is Honest and Trustworthy	❍	❍	❍	❍	❍	❍
2.	Resident treats patients and families with courtesy, compassion and respect	❍	❍	❍	❍	❍	❍
3.	Resident treats me and other member of the team with courtesy and respect	❍	❍	❍	❍	❍	❍
4.	Resident shows regard for my opinions	❍	❍	❍	❍	❍	❍
5.	Resident maintains a professional manner and appearance	❍	❍	❍	❍	❍	❍
	INTERPERSONAL AND COMMUNICATIONS SKILLS						
6.	Resident communicates well with patients, families, and members of the healthcare team	❍	❍	❍	❍	❍	❍
7.	Resident provides legible and timely documentation	❍	❍	❍	❍	❍	❍
8.	Resident respect differences in religion, culture age, gender sexual orientation and disability	❍	❍	❍	❍	❍	❍
	SYSTEMS BASED PRACTICE						
9.	Resident works effectively with nurses and other professionals to improve patient care.	❍	❍	❍	❍	❍	❍
	PATIENT CARE						
10.	Resident respects patient preferences	❍	❍	❍	❍	❍	❍
11.	Resident is reasonable accessible to patients	❍	❍	❍	❍	❍	❍
12.	Resident take care of patient comfort and dignity during procedures.	❍	❍	❍	❍	❍	❍
	PRACTICE BASED LEARNING AND IMPROVEMENT						
13.	Resident facilitates the learning of students and other professionals	❍	❍	❍	❍	❍	❍
	COMMENTS						
14.	Please describe any praises or concerns or information about specific incidents	❍	❍	❍	❍	❍	❍

THANK YOU for your time and thoughtful input. You play a vital role in the education and training of the internal medicine residents.

Poor: 0, Fair: 1, Good: 2, V. Good: 3, Excellent: 4

Total Score _____/56

RAWALPINDI MEDICAL UNIVERSITY

4

Patient Evaluation of Trainee

Trainee Name: _____

Date of Evaluation: _____

1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

Please circle the appropriate number for each item using this scale. Please provide any relevant comments on the back of this form.

	This Trainee:	Scale				
1.	Introduces him/herself and greets me in a way that makes me feel comfortable. ڈاکٹر صاحب نے خود کو متعارف کرایا اور خوش اسلوبی سے پیش آئے	1	2	3	4	5
2.	Manages his/her time well and is respectful of my time. ڈاکٹر صاحب نے میرے اور اپنے وقت کا خیال رکھا۔	1	2	3	4	5
3.	Is truthful, upfront, and does not keep things from me that I believe I should know. ڈاکٹر صاحب نے میرے مرض کی صورتحال پوری سچائی سے بیان کی۔	1	2	3	4	5
4.	Talks to me in a way that I can understand, while also being respectful. ڈاکٹر صاحب نے میرے احساسات کا خیال رکھا اور عزت سے میرا علاج کیا۔	1	2	3	4	5
5.	Understands how my health affects me, based on his/her understanding of the details of my life. ڈاکٹر صاحب نے میرے علاج میں میری صحت پر ذاتی زندگی کو مدنظر رکھا۔	1	2	3	4	5
6.	Takes time to explain my treatment options, including benefits and risks. ڈاکٹر صاحب نے میرے مرض کے علاج کے فوائد اور نقصانات کو تفصیلاً بیان کیا۔	1	2	3	4	5

Total Score _____/30

RAWALPINDI MEDICAL UNIVERSITY

5

Resident/Fellow Evaluation of Faculty Teaching

Evaluator: _____

Evaluation of: _____

Date:_____

Evaluation information entered here will be anonymous and made available only in aggregated form.

S#		Strongly Disagree	Disagree Moderately	Disagree Slightly	Agree Slightly	Agree Moderately	Strongly Agree
	PATIENT CARE						
1.	Teaches current scientific evidence for daily patient management*						
2.	Explains rationale behind clinical judgements/decisions*						
3.	Teaches clear diagnostic algorithms*						
4.	Teaches clear treatment algorithms*						
	PATIENT CARE - OPERATIVE AND PROCEDURAL SKILLS						
5.	Teaches operative/procedural skills during cases*						
6.	Allows learners to perform operative/procedural skills when appropriate*						
	MEDICAL KNOWLEDGE						
7.	Teaches relevant pathophysiology needed to evaluate patient medical conditions*						
8.	Teaches how/when to use-order-perform procedures/tests*						
9.	Teaching content adds significantly to my medical knowledge						
10.	Teaches the use of literature / evidence based medicine to support clinical decisions/teaching points*						

RAWALPINDI MEDICAL UNIVERSITY

5

PRACTICE-BASED LEARNING & IMPROVEMENT/TEACHING							
11.	Asks questions about differential diagnosis*						
12.	Teaches trainees when to consider referrals/consults with other specialists*						
13.	Actively teaches trainees in clinical settings/labs*						
INTERPERSONAL & COMMUNICATION SKILLS							
14.	Motivates learners to expand medical knowledge*						
15.	Stimulates critical thinking*						
16.	Encourages questions*						
17.	Teaches at the appropriate level for the trainee*						
18.	Provides feedback specific enough to be helpful*						
PROFESSIONALISM							
19.	Demonstrates respect for trainees of all levels*						
20.	Does not belittle/ publicly humiliate learners*						
21.	Teaches professional behavior with respect to patient care.*						
22.	Exhibits professional behavior with respect to patient care*						
23.	Role models professional behavior*						
SYSTEMS-BASED PRACTICE							
24.	Teaches cost/benefit decision making*						
25.	Teaches how to call on resources in the system to provide optimal health care*						
26.	Role models the necessity of working in inter-professional teams to enhance patient safety/outcomes.*						

Strongly Disagree: 0, Disagree Moderately: 1, Disagree Slightly: 2, Agree Slightly: 3, Agree Moderately: 4, Strongly Agree: 5

Total Score _____ / 130

RAWALPINDI MEDICAL UNIVERSITY

6

FINAL Evaluation Scoring Sheet

Name of Resident	Name of Supervisor	Year of Training

Date _____

Duration of Assessment _____

Specialty _____

Hospital _____

Unit _____

	Faculty #1 (165)	Faculty #2 (165)	Faculty #3 (165)	Average Score	Patient # 1 (30)	Patient # 2 (30)	Patient # 3 (30)	Medical Record Performa #1 (80)	Medical Record Performa #2 (80)	Medical Record Performa #3 (80)	Staff # 1 (56)	Staff #2 (56)	Staff #3 (56)
Medical Patient Care (30)				___/30									
Medical Knowledge (30)				___/30									
Professionalism (35)				___/35									
Interpersonal and Communication Skills (20)				___/20									
System Based Practice (35)				___/35									
Practice Based Learning and Improvement (15)				___/15									
Overall Rating													
Average:	_____/165				___/30			___/80			___/56		

Grand Total

_____/331

7

RAWALPINDI MEDICAL UNIVERSITY

RESIDENT SELF-ASSESSMENT PROFORMA

Resident Name_____ **Date** _____

Year of Training _____ **Hospital Name**_____ **Unit** _____

❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Not Applicable	I rarely demonstrates (<25% of the time)	I do this Sometimes (25-50% of the time)	I do this most of the time (50-75% of the time)	I do this all the time (>75% of time)

1.	I am able to acquire accurate and relevant histories from my patients in an efficient, prioritized and hypothesis driven fashion.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
2.	I am able to seek and obtain appropriate, verified, and prioritized data from secondary sources (e.g. family, records and pharmacy)	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
3.	I am able to perform accurate physical examinations that are appropriately targeted to the patient's complaints.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
4.	I am able to synthesize all available data, including interview, physical exam, and preliminary lab data to define each patient's central clinical problem.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
5.	I am able to develop prioritized differential diagnoses, evidence based diagnostic and therapeutic plans for common conditions in Internal Medicine patients.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
6.	I am able to recognize situations with a need for urgent or emergent medical care, including life threatening conditions.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
7.	I am able to recognize when to seek additional guidance.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
8.	I am able to provide appropriate preventive care.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
9.	I am able to manage patients with common clinical disorders in the practice of outpatient internal medicine with minimal supervision.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
10.	I have performed several invasive procedures and documented them in my New Innovations log.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
11.	I demonstrate sufficient knowledge to diagnose and treat common conditions that require hospitalization.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
12.	I understand the indications for and the basic interpretation of common diagnostic tests.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
13.	I have reviewed my in service exam scores and believe my medical knowledge is where it should be for my level of training.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
14.	I am able to identify clinical questions as they emerge	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4

RAWALPINDI MEDICAL UNIVERSITY

7

	in patient care activities.					
15.	I am responsive to feedback from all members of the healthcare team including faculty, residents, students, nurses, allied health professionals, patients and their advocates.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
16.	I am an active participant in teaching rounds and intern report.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
17.	I effectively use verbal and non verbal skills to create rapport with patients and their advocates.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
18.	I communicate effectively with other caregivers to ensure safe transitions in care.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
19.	My patient presentations on rounds are organized, complete and succinct.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
20.	I am able to communicate the plan of care to all the members of the healthcare team.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
21.	My documentation in the medical record is accurate, complete and timely.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
22.	I accept personal errors and honestly acknowledge them.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
23.	I demonstrate compassion and respect to all patients.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
24.	I complete my clinical, administrative and academic tasks promptly.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
25.	I maintain patient confidentiality	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
26.	I log my duty hours regularly and make every effort not to violate the rules	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
27.	When I feel I am too fatigued to work safely, I understand that I can call the chief medical residents for back-up.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
28.	I understand the unique roles and services provided by the workers in the local health delivery system (social workers, case managers, dept of public health etc...)	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
29.	I am able to identify, reflect on, and learn from critical incidents and preventable medical errors.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
30.	I do my best to minimize unnecessary care including tests, procedures, therapies and consultations.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4

Please identify three specific clinical skills that you have improved over the past six months:

Please set three specific goals for the next six months:

Signature _____ **Date** _____

Rawalpindi Medical University

8

DIRECT OBSERVATION OF PROCEDURAL SKILLS (DOPS)

Please complete the questions using a cross ☒ Please use black ink and CAPITAL LETTERS

Doctor's Name: _____

PMDC Number: _____

Clinical setting: A&E ☐ OPD ☐ In-patient ☐ Acute Admission ☐ Other

Procedure number ☐☐

Assessors position: Consultant ☐ SpSR ☐ SpR ☐ Specialty doctor ☐ Nurse ☐ Other ☐

Number of previous DOPS observed by assessor with any trainee: 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5-9 ☐ >9 ☐

Number of times procedure performed by trainee: 0 ☐ 1-4 ☐ 5-9 ☐ >10 ☐

Difficulty of procedure: Low ☐ Average ☐ High ☐

Please grade the following areas	Well below expectations	Below Expectations	Borderline	Meets Expectations	Above Expectations	Well above expectations	U/C*
	1	2	3	4	5	6	
1 Demonstrate understanding of indications, relevant anatomy, technique of procedure	☐	☐	☐	☐	☐	☐	☐
2 Obtains informed consent	☐	☐	☐	☐	☐	☐	☐
3 Demonstrates appropriate preparation pre-procedure	☐	☐	☐	☐	☐	☐	☐
4 Appropriate analgesia or preparation pre-procedure	☐	☐	☐	☐	☐	☐	☐
5 Technical ability safe sedation	☐	☐	☐	☐	☐	☐	☐
6 Aseptic technique	☐	☐	☐	☐	☐	☐	☐
7 Seeks help where appropriate	☐	☐	☐	☐	☐	☐	☐
8 Post procedure management	☐						
9 Communication skills	☐	☐	☐	☐	☐	☐	☐
10 Consideration of Patient/professionalism	☐	☐	☐	☐	☐	☐	☐
11 Overall ability to perform procedure	☐	☐	☐	☐	☐	☐	☐

* U/C Please mark this if you have not observed the behaviour and therefore feel unable to comment.

Please use this space to record areas of strength or any suggested development

U/C

Anything especially good?	Suggestions for development:

Have you had training in the use of this assessment tool? ☐ Face to face ☐ Have read guidelines ☐ Web/ CD-Rom

Time taken for observation: (in minutes) ☐☐

Assessors signature:

Date (mm/yy) ☐☐ / ☐☐

Time taken for feedback ☐☐

Assessor's Name: _____

*if appropriate Please note failure of return of all completed forms to your administrator is a probity issue

Acknowledgement: Adapted with permission of the American Board of internal Medicine

SpSR - Specialty Senior Registrar

SpR - Specialty Registrar

RAWALPINDI MEDICAL UNIVERSITY

9

CASE BASED CLINICAL EVALUATION OF TRAINEE

Resident's Name: _____

Evaluator's Name(s): _____

Hospital Name: _____

Date of Evaluation: _____

☐ Traditional Track (10% Clinic) ☐ Primary Care Track (20% Clinic)

1	Unsatisfactory
2	Below Average
3	Average
4	Good
5	Superior

Please circle the appropriate number for each item using the scale above.

History	Scale				
1. Introduces himself and greet the patient.	1	2	3	4	5
2. Listen to the patient problems.	1	2	3	4	5
3. Shows politeness and empathy	1	2	3	4	5
4. Gathers proper information of present and past history	1	2	3	4	5
Physical Examination	**Scale**				
1. Physical examination done correctly	1	2	3	4	5
2. Pick physical signs correctly	1	2	3	4	5
3. Relevant examination done in detail	1	2	3	4	5
4. Interpret physical signs correctly	1	2	3	4	5
Assessment Plans	**Scale**				
1. Can list a logical differential diagnosis	1	2	3	4	5
2. Defend the diagnosis logically	1	2	3	4	5
3. Identifies patient active problems	1	2	3	4	5
Interpretation and Correlation of Laboratory and Imaging Data	**Scale**				
1. Can order logical and relevant investigations	1	2	3	4	5
2. Correctly interpret investigations (Laboratory and Imaging)	1	2	3	4	5
3. Formulate a logical management plan	1	2	3	4	5
4. Treatment plan is logical and relevant	1	2	3	4	5
5. Able to write a proper prescription	1	2	3	4	5

Department of

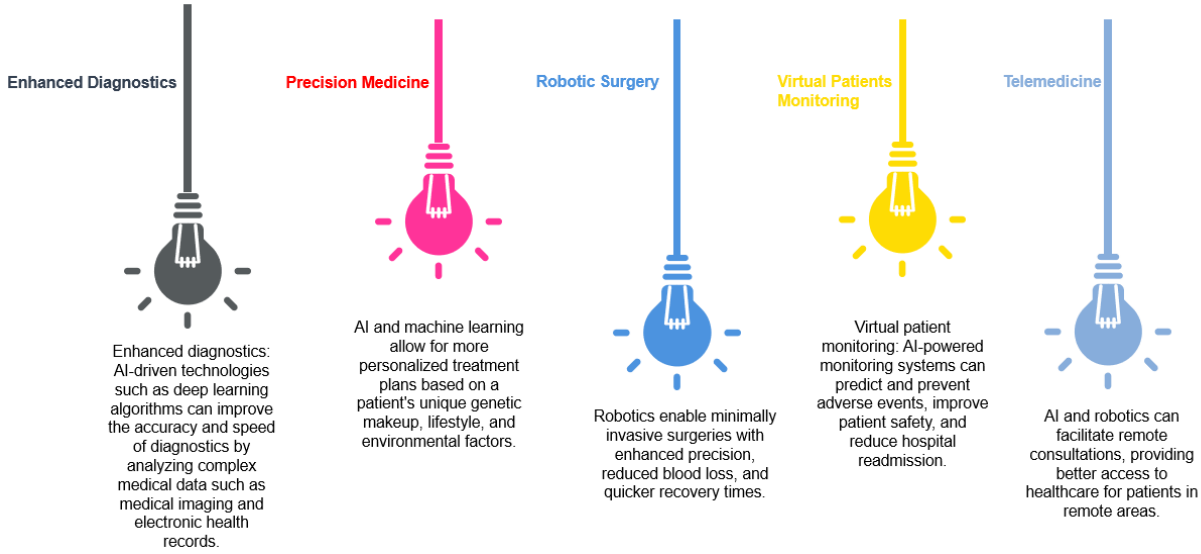
Artificial Intelligence

Rawalpindi Medical University

INTRODUCTION

The advent of AI, robotics, machine learning, and informatics has revolutionized the medical field in recent years. These advanced technologies have enhanced medical diagnostics, treatment planning, and patient care while simultaneously reducing costs and improving outcomes. In order to ensure that the medical professionals of Pakistan are equipped to leverage these advancements, it is proposed that Rawalpindi Medical University establish a Department of AI and Robotics. This department will provide undergraduate and postgraduate students of medicine and surgery with specialized courses and hands-on training in these emerging technologies, ensuring they are well-prepared to excel in their respective fields.

General Benefits Of A.I In Medical Education



AI is transforming orthopedic surgery by enhancing diagnostics, surgical planning, and patient care. Key areas include:

1. AI IN DIAGNOSTICS :

AI improves the interpretation of X-rays, MRIs, and CT scans, aiding in early detection of fractures, arthritis, and tumors. Predictive analytics can forecast disease progression.

2. SURGICAL PLANNING :

AI assists in preoperative planning, customizing implants, and simulating surgical outcomes. Virtual tools enhance training and decision-making.

3. ROBOTIC SURGERY :

AI powers robotic systems to increase precision in joint replacements and other surgeries, with AI-guided navigation optimizing surgical accuracy.

4. POSTOPERATIVE CARE :

AI monitors recovery using wearable devices, predicts complications, and tailors rehabilitation plans to improve patient outcomes.

5. OUTCOME PREDICTION AND MANAGEMENT :

AI tools predict surgical outcomes, helping clinicians make evidence-based decisions and personalize patient care.

6. ETHICAL AND PRACTICAL ISSUES :

Ethical concerns include data privacy, AI biases, and regulatory compliance. These need addressing to ensure safe AI integration in healthcare.

FUTURE OF AI

Orthopedic surgery is poised to revolutionize the field through enhanced diagnostic accuracy, personalized treatment, and improved surgical precision. AI-driven tools will assist in preoperative planning by analyzing medical imaging and predicting surgical outcomes, while robotic systems will offer greater precision in procedures like joint replacements and spine surgeries. Furthermore, AI will enable the development of customized implants using 3D printing, tailored to individual patient anatomy, and facilitate smarter rehabilitation through wearable devices that monitor recovery in real-time. As AI continues to integrate into clinical workflows, it will enhance decision-making, reduce human error, and ultimately lead to better patient outcomes and more efficient healthcare delivery.