ORTHOPAEDICS

Residency Training Program
Leading to the degree of

Master of Surgery (MS Orthopaedics)

SHAHEED ZULFIQAR ALI BHUTTO MEDICAL UNIVERSITY
ISLAMABAD

DEDICATION

Dedicated to all faculty Members of Curriculum Committee whose persistent efforts in the field of medical education will always be reminisced.

PREFACE

The Shaheed Zulfiqar Ali Bhutto Medical University (SZABMU), a public sector federal University, was established in the premises of postgraduate medical institute, Pakistan Institute of Medical Sciences, Islamabad by an ordinance of national assembly on 21 March, 2013.

Since its inception the university has made an impact in the field of healthcare, undergraduate, postgraduate medical education and research pertaining to grave health problems faced by our country. The Shaheed Zulfiqar Ali Bhutto Medical University is offering 27 post-graduation MD/MS programs. Currently the University is offering 11 Master of Surgery (MS) Programs in field of Surgery and Allied. These are four to six years' programs, classified as a Level III degree by Pakistan Medical Council and fall within Level 7 Category, as per National Qualifications Framework, Higher Education Commission of Pakistan.

In order to meet the standards of the World Federation of Medical Education a paradigm shift has ensued in the field of medical education. The standards provide a template for Institutes carrying out Post Graduate Programs. This led to developing the curriculum as per international standards of Medical Education and in congruence with the cultural, regional and demographic facets of the country.

Department of medical education of SZABMU started functioning in 2014. DME is headed by Dean and has various co- opted members including Dr. Fouzia Sultana and Dr. Zainab Abdullah who worked diligently and integrated the undergraduate curriculum in October 2021. It was also made possible by the conscientious efforts of different curriculum committees who clipped it according to the requirement of Higher Education Commission. The final draft of the curriculum is an attribute to all those who remained involved in the planning, development and evaluation of the curriculum.

Prof. Tanwir Khaliq

Vice Chancellor, SZABMU

ACKNOWLEDGEMENTS

We would like to express our gratitude and appreciation to all those who gave us the opportunity to complete the curriculum.

Department of Medical Education is very grateful to the Worthy Vice Chancellor Prof. Tanwir Khaliq for his vision in initiating the revised curriculum for MS programs in Shaheed Zulfiqar Ali Bhutto Medical. Our special gratitude to the entire curriculum committee for their support and hard work.

Assistant Professor, DME SZABMU

Dr. Fouzia Sultana

Dr. Zainab Abdullah

CURRICULUM

Master of Surgery (MS)

Orthopaedics

CURRICULUM DEVELOPMENT COMMITTEE

This Curriculum is developed by the following committee:

- **Dr Rizwan H. Malik**
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ROAD MAP OF MS ORTHOPAEDICS

(A Brief Summary)

GENERAL INFORMATION AND PROGRAM GOALS:

The Shaheed Zulfiqar Ali Bhutto Medical University is offering 21 post-graduation programs of various levels in different specialties in medicine. The University came into being in 2013 and over a course of time she has produced intelligent health care professionals with unique leadership attributes and professional proficiency. The Master of Surgery (MS) in Orthopaedics is a course aimed to attract candidates who to yearn to become a competent surgeon. It is a four years' program, classified as a Level III degree by Pakistan Medical Council and falls within Level 7 Category, as per National Qualifications Framework, Higher Education Commission of Pakistan.

The Curriculum focuses on formal teaching, acquisition of knowledge, skill and competence. The student will develop into a skillful researcher so that ultimately a degree holder of MS Orthopaedics is an evidence based proficient surgeon with modified attitude and practice towards patient management. The students, upon graduation, are expected to demonstrate a high level of expertise in the field of Orthopaedics.

COURSE DESCRIPTION:

The course provides continuous medical education to the students with dedicated mentorship in clinical training. The students are taught the essentials of Surgery in general in conjunction with Orthopaedics both with Trauma related and non-trauma related Emergency Surgery. The students undergo academic sessions in lectures and small groups, in emergency, ward, Out Patient department and Operation rooms for minor and major procedures, in pursue of Emergency and Elective Surgical context. Management attributes may be shared by the Intensivists. Patients are evaluated in light of laboratory and imaging modalities and multidisciplinary approach is taught as the basis of patient management.

The Course can be described in the following subsequent points in time:

- MS Part I Examination and Admission
- 1st and 2nd years of Clinical Training with prediliction towards:
    - Principals of Surgery in General
    - Basic Surgical Skills
    - Emergency Surgery
    - Preoperative preparation
    - Intraoperative Management
    - Post Operative care and managing eary and late Complications
    - Wound Care
    - The Mandatory Workshops are covered preferentially in early training.
    - The Research Question is put up, the Synopsis devised and applied for approaval in the 1st year to the ERB and AS&RB.
    - Quaternaly Formative Assessment of the Candidate by the supervisor is submitted

- Summative Mid Term Assesment (MTA) by the University
- 3rd and 4th year of Clinical Training with Prediliction towards:
    - Specialized Surgery
    - Higher Level of Competency in Surgical Procedures
    - Mandatory Surgical Rotations if not alloted earlier in training
    - Comencement of Research work
- 5th year of Clinical Training in MS Orthopaedics Concludes with:
    - Leadership Skills and Teamwork and teaching competency
    - Proficiency in planing patient management
    - Eliciting the recommended Surgical Competency
    - Research Writing Orientation and conclusion of Reasearch work with submission of Thesis for Approaval
- Summative Final Examination of MS Orthopaedics
    - Theory Examination (Papers A and B)
    - OSCE
    - Long Case
    - Short Cases
    - Thesis Defence

Attention to the topics listed will ensure that the trainee has covered, to a substantial degree, those areas of each discipline considered as essential core knowledge. The coverage that each discipline receives below is not indicative of the relative importance placed on each discipline in the training program, or in the Examination.

It is understood that each trainee will not have the opportunity to become proficient in all skills during a five-year training program. However, each trainee should endeavor to at least observe every procedure being performed and, if possible, to participate in it as actively as possible.

Requirements of MS Orthopaedics to Enroll Graduate Students in the Program

- Fulfillment of University requirements for postgraduate study.
- Five (5) years of consecutive full-time advanced study and clinical training.
- Complete and approved master's thesis based on original research during the course of study in an area related to specialty, suitable for publication in a reputable medical & surgery journal.
- Must complete all didactic & clinical work in the required curriculum and satisfactorily pass all the University examinations.
- A minimum of 60% must be earned in all work/examinations attempted in the master's program. A grade below this will require re-examination.

A complete road map for postgraduate MS can be seen on University website at http://www.szabmu.edu.pk/content/downloads/revised-road-map-for-postgraduate-residents.pdf

INTRODUCTION

INTRODUCTION

The residency program in Orthopaedics is a five-year course covering all aspects of Orthopaedics, leading to the degree of Masters Surgery (MS) in Orthopaedics. This curriculum has been developed in light of the core Orthopaedics Knowledge and basic Surgical skills required for a Level 7 category program and is indicative of the competencies required at the varying levels of training. The requirements within the specialty are delineated together with the knowledge, skills and attitudes achieved by the trainee in acquiring those competencies. The training has been devised on the basis of:

- Greater protection of the public interest by providing clear information as to the level of training achieved.
- Improved access to specialty training than general practitioners.
- Greater flexibility of training through the availability of multiple instructors.
- Producing a competent workforce with the appropriate skills and knowledge necessary to meet the varying levels of treatment complexity, as well as considering the relative need and demand of potential patients.
- Acquire the experience to carry out research projects, critically evaluate scientific publications and communicate clinical and research papers in journals and conferences.

RATIONALE

RATIONALE:

Need of program

This training program is structured keeping in view the need of the society. Effective provision of Orthopaedics facilities to the public at large especially in remote areas is need of the hour. An institute yielding proficient surgeons, well aware of the recent statutes of health care, is duly requires as a valuable addition to the health care system.

Purpose of training

The purpose of this curriculum is to guide the training of an individual to the core level of competence required for specialist and consultant. This training will produce consultant who are specialists in their field.

Context of Training

To provide an organized educational program with guidance and supervision, a structured training program will be followed so that each trainee is exposed to different aspects of the subject and acquires special knowledge and skill as expected in this program. The training will provide a basis for the candidate to develop into a lifelong learner who is capable of self-reflection and self-directed learning. It will provide a basis for further ongoing development in the field.

Duration of training

The program leading to MS Orthopaedics will be of 05 years full time.

AIMS & OBJECTIVES

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Aims of Training

The candidate should acquire and become proficient in the skills required for Orthopaedics practice with an emphasis on Trauma and non-Trauma related Emergency Surgery, basic General Surgical Skills, Preoperative preparation, Intraoperative and post-operative care and management of complication with long term follow up. There is special concern for wound management and decision of treatment regimens and holistic management involving multidisciplinary treatment planning, and Intensive Care treatments. Due importance is paid to history taking and examination skills and appropriate use of laboratory and Imaging facilities for efficient and timely Correct diagnosis. The Competency required for a surgeon in specialty surgical procedures is primarily vested in the student. The candidate should demonstrate attitudes necessary for the achievement of high standards of surgery practice both in relation to the health needs of the population and to his/her own personal development.

Learning Objectives

At the end of the clinical training for MS Orthopaedics a trainee shall be able to:

1. Initially assess the patients seeking surgical treatment for their problems by:
    - obtaining pertinent history.
    - performing correct physical examinations.
    - formulating a working diagnosis.
    - deciding whether the patient requires:
    - ambulatory care or hospitalization.
    - referral to other health professionals.
    - emergency care including life saving measures.
2. Manage patients requiring surgical treatment as follows:
    - plan an enquiry strategy i.e. order appropriate investigations and interpret the results.
    - when required, perform specified surgical procedures independently and competently.
    - deal effectively and promptly with complications which may occur during the course of disease or treatment.
    - maintain records of patients including summarization and indexing.
    - seek consultation when needed.
    - carry out effective and efficient management of emergency situations.

3. undertake research and publish findings.
4. acquire new information; assess its utility and make appropriate applications.
5. recognize the role of teamwork and function as an effective member/ leader of the team.
6. advise the community on matters related to promoting health and preventing disease.
7. train para-professionals and other/ junior members of the team.

On completion of training, the trainee will be able to achieve following aptitudes:

- Access and apply relevant knowledge to clinical practice
- Maintain currency of knowledge
- Apply scientific knowledge in practice
- Appropriate to patient need and context
- Critically evaluate new technology
- Safely and effectively performs appropriate surgical procedures:
- Consistently demonstrate sound surgical skills
- Demonstrate procedural knowledge and technical skill at a level appropriate to the level of training
- Demonstrate manual dexterity required to carry out procedures
- Adapt their skills in the context of each patient and procedure
- Maintain and acquire new skills
- Approach and carry out procedures with due attention to safety of patient, self and others
- Critically analyze their own clinical performance for continuous improvement
- Design and implement effective management plans
- Recognize the clinical features, accurately diagnose and manage surgical problems
- Formulate a well-reasoned provisional diagnosis and management plan based on a thorough history and examination
- Formulate a differential diagnosis based on investigative findings

Specific Skill

- Take history and conduct clinical examination and investigations that allow evaluation of all surgical patients.
- Determine the differential, provisional and definitive diagnosis by interpreting and correlating findings from the history, clinical & radiographic examination together with other diagnostic tests.
- Devise treatment plans specific to the needs and expectations of individual patients.
- Execute conventional and contemporary techniques of all the domains of Orthopaedics Surgery.
- Demonstrate competency in teaching methods, use of information technology, appraisal and assessment techniques and development of appropriate learning methods for lifelong learning.
- Show evidence of ability to undertake research.

Attitude

- Demonstrate a professional and ethical approach to patient care.
- Demonstrate a professional attitude to all the members of the team.
- Demonstrate full and clear understanding of equality and diversity legislation as it applies to the workplace and to professional practice.

ENTRY CRITERIA

ENTRY CRITERIA

Eligibility to apply for MS Orthopaedics

- Candidate must possess MBBS or equivalent degree and one-year house job from PMC recognized Institutions.
- Permanent valid registration with PMC.
- Declared successful in MS Part-I for University programs.
- In case of foreign candidate, valid registration with Medical Council of their country of origin must be produced.

Required Documents

Attested photo copies of the following documents must be attached with the application form:

- Computerized National Identity Card (CNIC)
- Domicile certificate
- Matric/O Level, FSc/A Level, Certificates or equivalent
- MBBS degree with detail marks certificates of all professional
- MBBS Attempts certificates of all professional
- NEB pass certificate (for foreign graduates)
- House Job certificates
- PMC valid permanent registration certificate
- MS Part-I passing certificate
- Experience Certificates (if any)
- Migration Certificate (To be produced at the time of admission)

Admission Procedure

- Details of admission procedure is available on university website at http://www.szabmu.edu.pk/admission/postgraduate-admission

CONTENT OF LEARNING

CONTENT OF LEARNING

The program outline addresses both the knowledge needed in a General Surgical Patient. A minimum of five years of formal training through a graded system of education as specified will equip the trainee with knowledge, skill and attitude at its completion to be able to practice basic general surgery competently.

The specific training component would include the following areas:

1st Year:

Competencies to be acquired during residency programme including emergency duty of two per week (minimum):

- History taking and case presentation
- Principles of traction application
- POP application, principles and technique
- Implant prescription
- OT sterilization techniques
- Debridement, soft tissue handling and suture techniques
- Intra articular injections
- Close treatment of dislocations of the shoulder, hip, elbow, small joints of hand and foot, fractures of tibia, fibula, humerus, radius and ulna.

2nd and 3rd Years:

Competencies to be acquired during residency programme including emergency duty of two per week (minimum):

During the second half of year II, the following areas (nonoperative) will be emphasized:

- External fixation of fractures of the upper and lower limbs
- Skin grafting
- Biopsy
- Bone grafting
- I/M nailing of long bones
- Plating long bones
- Surgery in PPD and CP like tendon elongations/transfers etc.
- Fixation of trochanteric and femoral neck fractures

- Fixation of the lower end of femur, humerus, radius and ulna
- Emergency management of poly trauma
- Hemiarthroplasty of the hip
- Close nailing.

4th and 5th Years:

Competencies to be acquired during residency programme including emergency duty of one per week (minimum):

Special attention to be given to the following areas:

- Nerve repair
- Tendon repair
- Osteotomies
- Arthrodesis
- Paediatric Orthopaedics (CTEV, DDH, contracture release etc.)
- Tumour surgery including amputations.

Trainees will perform all types of regular surgeries as mentioned in the previous section and special emphasis will be laid on the following:

- Hand surgery
- Arthroscopy
- Total joint replacements
- Spine surgery
- Bone tumours (limb salvage surgery)
- Paediatric Surgery.

The objectives of the training may be achieved through different modes, some of which are listed below:

- Graded responsibility in patient care e.g.
- Ward duties
- Operation theatre duties
- Emergency duties
- OPD duties
- Morbidity/mortality review meetings
- Journal club
- Seminars, conferences and lectures
- Research project.

COMPETENCIES

COMPETENCIES

All students are expected to reach a level of competence in different years of training after performing at least a said number of procedures at various levels of competence. Students are initially observing with the supervisor performing, later they are directly involved for assistance. Subsequently the skill acquisition level is raised with the student performing under direct supervision and later independently, when supervision is indirect.

Given here is a list of competencies that the student is supposed to achieve working with the supervisor in charge, peaking the graph at an achievable pace for the student. The level of competency is denoted by a number, as mentioned, and the minimal number of cases listed.

Observer Status=1, Assistant status=2, Under Direct Supervision=3, Under Indirect Supervision=4

COMPETENCIES FIRST YEAR		
Competency	**Level of Competence**	**No. of cases**
History Taking	**4**	**40**
Physical Examination	**4**	**40**
Ordering Investigations	**4**	**40**
Interpreting results	**3 & 4**	**40**
Deciding and implementing appropriate treatment	**3 & 4**	**40**
Post operative management & monitoring	**3 & 4**	**40**
Presentation skills long cases:	**3 & 4**	**16**
Presentation skills short cases:	**3 & 4**	**60**
Use of Orthopaedic Instruments	**3 & 4**	**40**
Skeletal Traction / Skin Traction	**2 & 4**	**24**
Application of Plaster of Paris Cast	**2 & 4**	**80**
Closed treatment (Manipulations)	**2 & 4**	**80**
Closed treatment of dislocations	**2 & 4**	**40**
Skin Grafting	**2 & 4**	**10**
Biopsy	**2 & 4**	**10**

COMPETENCIES FIRST YEAR		
Competency	**Level of Competence**	**No. of cases**
External fixation of fractures of lower limb / ilizarov	**2 & 3**	**16**
External fixation of fractures of upper limb	**2 & 3**	**08**
Bone grafting	**2 & 3**	**11**
Fixation of bones with plates	**2 & 3**	**10**
Intramedullary nailing of long bones	**2 & 3**	**16**
Fixation of trochanteric and neck of femur fractures	**2 & 3**	**25**
Fixation of fracture around knee joint	**1, 2 & 3**	**20**
Complex trauma / Poly trauma	**1 & 2**	**10**
Osteotomies	**1 & 2**	**08**
Arthrodesis	**1 & 2**	**05**
Amputation	**1, 2 & 3**	**10**
Tendon repair	**1, 2 & 3**	**10**
Nerve repair	**1 & 2**	**05**
Hemiarthoplasty of hip	**1, 2 & 3**	**10**
Fracture fixation of hand and wrist	**1, 2 & 3**	**10**
Bone tumor surgery	**1 & 2**	**05**

COMPETENCIES SECOND & THIRD YEARS		
Competency	**Level of Competence**	**No. of cases**
History Taking	**4**	**40**
Physical Examination	**4**	**40**
Ordering Investigations	**4**	**40**
Interpreting results	**3 & 4**	**40**
Deciding and implementing appropriate treatment	**3 & 4**	**40**
Post operative management & monitoring	**3 & 4**	**40**
Presentation skills long cases:	**4**	**16**
Presentation skills short cases:	**4**	**60**
Use of Orthopaedic Instruments	**4**	**40**
Skeletal Traction / Skin Traction	**4**	**24**
Application of Plaster of Paris Cast	**4**	**80**
Closed treatment (Manipulations)	**4**	**80**
Closed treatment of dislocations	**4**	**40**
Skin Grafting	**3 & 4**	**10**
Biopsy	**3 & 4**	**10**

COMPETENCIES SECOND & THIRD YEARS		
Competency	**Level of Competence**	**No. of cases**
External fixation of fractures of lower limb / ilizarov	**3 & 4**	**16**
External fixation of fractures of upper limb	**3 & 4**	**08**
Bone grafting	**3 & 4**	**11**
Fixation of bones with plates	**3 & 4**	**10**
Intramedullary nailing of long bones	**3 & 4**	**16**
Fixation of trochanteric and neck of femur fractures	**2 & 4**	**25**
Fixation of fracture around knee joint	**2 & 3**	**20**
Complex trauma / Poly trauma	**2 & 3**	**10**
Osteotomies	**2, 3 & 4**	**08**
Arthrodesis	**2 & 3**	**05**
Amputation	**2, 3 & 4**	**10**
Tendon repair	**2, 3 & 4**	**10**
Nerve repair	**2 & 3**	**05**
Hemiarthoplasty of hip	**2, 3 & 4**	**10**
Fracture fixation of hand and wrist	**1 & 2**	**10**
Bone tumor surgery	**2 & 3**	**05**

COMPETENCIES FOURTH & FIFTH YEARS		
Competency	**Level of Competence**	**No. of cases**
History Taking	**4**	**40**
Physical Examination	**4**	**40**
Ordering Investigations	**4**	**40**
Interpreting results	**3 & 4**	**40**
Deciding and implementing appropriate treatment	**3 & 4**	**40**
Post operative management & monitoring	**3 & 4**	**40**
Presentation skills long cases:	**4**	**16**
Presentation skills short cases:	**4**	**60**
Use of Orthopaedic Instruments	**4**	**40**
Skeletal Traction / Skin Traction	**4**	**24**
Application of Plaster of Paris Cast	**4**	**80**
Closed treatment (Manipulations)	**4**	**80**
Closed treatment of dislocations	**4**	**40**
Skin Grafting	**3 & 4**	**10**
Biopsy	**3 & 4**	**10**

COMPETENCIES FOURTH & FIFTH YEARS		
Competency	**Level of Competence**	**No. of cases**
External fixation of fractures of lower limb / ilizarov	**4**	**16**
External fixation of fractures of upper limb	**4**	**08**
Bone grafting	**4**	**11**
Fixation of bones with plates	**4**	**10**
Intramedullary nailing of long bones	**4**	**16**
Fixation of trochanteric and neck of femur fractures	**4**	**25**
Fixation of fracture around knee joint	**4**	**20**
Complex trauma / Poly trauma	**3 & 4**	**10**
Osteotomies	**3 & 4**	**08**
Arthrodesis	**3 & 4**	**05**
Amputation	**4**	**10**
Tendon repair	**4**	**10**
Nerve repair	**3 & 4**	**05**
Hemiarthoplasty of hip	**4**	**10**
Fracture fixation of hand and wrist	**4**	**10**
Bone tumor surgery	**3 & 4**	**05**

GENERAL SURGERY GOALS

At the end of rotation resident must be able to demonstrate the competency in:

- Admitting to service.
- Pre-operative evaluation of the surgical patient.
- Pre-operative, inter-operative, post-operative patient care including fluid and electrolytes status, pulmonary care, cardiovascular function and wound care
- Application of surgical principles of dealing with wound care, wound healing, and wound infection.
- The insertion of central venous access lines, insertion and utilization of chest tubes and general surgical skills and techniques.

ARTHROPLASTY ROTATION GOALS

- Obtain a complete patient history and physical exam and develop a treatment plan for patients with degenerative conditions of the extremities, including those requiring reconstructive procedures
- Understand pathologic anatomy and biomechanics of the extremities
- Explain the implications of procedures to the patients undergoing surgical procedures
- Discuss following cognitive areas:

General

- Indications, contraindication, alternatives to surgery
- Pre-operative Planning
- Applied surgical anatomy and approaches
- Biomaterials (metals, PMMA, UHMWPE, ceramics, HA)
- Choice of implants and fixation
- Implant wear and loosening, implant biology
- Post-operative management, including complications such as dislocations, infections, thromboembolism
- Post-operative rehabilitation.

Hip

- Metabolic disease
- Rheumatoid arthritis
- Congenital hip dysplasia
- Non-arthroplasty hip reconstruction
- Aseptic loosening
- Infection
- Dislocation and instability
- Ectopic bone formation
- Periprosthetic fractures
- Evaluation of painful arthroplasties
- Principles of revision hip surgery, indications, and alternatives
- Bone grafting techniques

Knee

- Aseptic loosening
- Patellofemoral and extensor mechanism issues
- Infection
- Wound problems and soft tissue coverage
- Neurovascular complications
- Periprosthetic fractures
- Evaluation of painful arthroplasties
- Bone grafting techniques
- Principles of revision knee surgery, indications, and alternatives
- Management of bone loss and bone grafting
- Rehabilitation

HAND ROTATION GOALS

- Obtain a complete patient history and physical exam for common upper extremity conditions especially hand.
- Order appropriate radiographs to obtain for common hand and upper extremity conditions

- Interpret standard radiographs of hand and upper extremity
- Order and how to interpret electrodiagnostic studies
- Understand wrist and hand biomechanics
- Understand sterile technique, with the ability to appropriately prep and drape extremities
- Understand basic upper extremity anatomy
- Understand common upper extremity surgical approaches
- Understand appropriate soft tissue handling
- Perform standard open reduction and internal fixation of upper extremity fractures especially wrist and hand
- Work under loop magnification.
- Understand the technique for common soft tissue coverage procedures for hand
- Understand the technique for common upper extremity injections
- Understand how to recognize and evaluate common post-operative complications.

PAEDIATRIC ORTHO ROTATION GOALS

- Obtain complete a pediatric patient history and perform physical exam
- Recognize developmental stage and the role of parents during history-taking
- Evaluate pediatric patients with common musculoskeletal complaints
- Develop differential diagnosis and potential treatment plans for common orthopaedic conditions in pediatric patients
- Evaluate and describe potential treatment plans for common pediatric orthopaedic conditions, including but not be limited to the following:
- Foot deformities in the newborn (CTEV)
- The limping child in the one year, 6 year, and 12 year age groups
- Treatment of developmental hip dysplasia including the roles of closed reduction, arthrogram, open reduction, and open reduction combined with femoral and pelvic osteotomies.
- Slipped capital femoral epiphysis and Perthes disease of the hip
- Surgical treatment of Perthes disease including the indications and various treatment options (femoral vs. pelvic osteotomy).
- Rotational and angular deformities in the lower extremities of the child including genu varus

and valgus, intoeing, and out-toeing, including identifying normal variation

- Pathologic angular deformities in the lower extremities such as posterior medial and anterior lateral bowing of the tibia and Blount's disease of the knee
- Leg length discrepancy, including the various treatment options such as epiphysiodesis, shortening, and limb lengthening
- Pediatric osteochondrosis, Osgood-Schlatter's and Severs disease
- Neuromuscular diseases in the child including polio, cerebral palsy, muscular dystrophy and peripheral neuropathy such as CMT
- Hamstring/calf and adductor traction lengthening.
- Tendon transfers of the foot and ankle including anterior tibial tendon transfers, posterior tendon transfers, and split anterior tibial tendon transfers.
- Cavus foot deformities and flat foot deformities in the child
- Common bone dysplasias such as multiple hereditary exostosis, polyostotic fibrous dysplasia, osteogenesis imperfecta, multiple epiphyseal dysplasias, and multiple metaphyseal dysplasia
- Common paediatric fractures especially fractures around elbow including supracondylar, medial and lateral condyles and radial head
- Musculoskeletal infections in the child including osteomyelitis and septic arthritis

SPINE ROTATION GOALS

- Proficient in complete spinal and neurologic examinations
- Indications for obtaining specific diagnostic tests
- Interpret specific diagnostic tests.
- Knowledge of the diagnoses, evaluation, and treatment of common types of spinal deformities, including but is not limited to the following:
- Idiopathic
- Degenerative
- Traumatic
- Congenital
- Deformity
- Inflammatory

- Metabolic
- Infectious
- Neoplastic
- Spinal anatomy, especially in terms of surgical approaches
- Pathogenesis of common spinal deformities
- Indications for common spinal procedures.
- Indications and contraindications for surgery based on deformity etiology, locations, magnitude, and known natural history
- Knowledge of direct and indirect decompression, realignment, and stabilization, including arthrodesis, instrumentation, and other modalities (i.e., cast, brace, and halo)
- Knowledge of anterior and posterior surgical approaches to the thoracolumbar spine • Competency in complex post-operative management, including prevention, recognition, and treatment of complications.

COMPETENCIES
for
MANDATORY ROTATIONS

COMPETENCIES for Arthoplasty Rotation

Competencies	Level of Competency	Number of Cases
History Taking	**4**	**30**
Physical Examination	**4**	**30**
Ordering Investigations	**4**	**30**
Interpreting Results	**4**	**30**
Deciding and Implementing Appropriate Treatment	**4**	**30**
Post-Operative Management and Monitoring	**4**	**30**
Skills: Short Case	**3 & 4**	**24**
Presentation Skills:		
Long Case	**3 & 4**	**12**
Use of Relevant Surgical Instruments	**3 & 4**	**30**
Hemiarthroplasty of Hip	**2, 3 & 4**	**10**
Primary Total Hip Replacement	**2 & 3**	**10**
Primary Total Knee Replacement	**2**	**10**
Revision Total Knee Replacement	**2**	**5**

COMPETENCIES for Hand (Plastic Surgery)

Competencies	Level of Competency	Number of Cases
History Taking	**4**	**30**
Physical Examination	**4**	**30**
Ordering Investigations	**4**	**30**
Interpreting Results	**4**	**30**
Deciding and Implementing Appropriate Treatment	**4**	**30**
Post-Operative Management and Monitoring	**4**	**30**
Presentation Skills: Short Case	**3 & 4**	**24**
Presentation Skills: Long Case Use of Relevant Surgical Instruments	**3 & 4**	**12**
Hand / Wrist Fracture Fixation	**3 & 4**	**30**
Carpal Tunnel Release	**2 & 3**	**30**
Tendon Repair	**2 & 3**	**10**
Tendon Transfers	**2**	**06**
Nerve Repair	**2**	**06**
Surgery for Brachial Plexus Injury	**2 & 3**	**05**
	1 & 2	**04**

COMPETENCIES for Paediatric Orthopaedics

(Paediatric Surgery)

Competencies	Level of Competency	Number of Cases
History Taking	**4**	**30**
Physical Examination	**4**	**30**
Ordering Investigations	**4**	**30**
Interpreting Results	**4**	**30**
Deciding and Implementing Appropriate Treatment	**4**	**30**
Post-Operative Management and Monitoring	**4**	**30**
Presentation Skills: Short Case	**3 & 4**	**24**
Presentation Skills: Long Case	**3 & 4**	**12**
Use of Relevant Surgical Instruments	**3 & 4**	**12**
Pediatric Corrective Osteotomies	**2**	**12**
DDH Surgery	**2**	**08**
CTEV Surgery	**2**	**08**
Surgery in Cerebral Palsy	**2**	**08**
Surgery in Post-Polio Paralysis	**2**	**08**
Surgery in Pediatric foot anomalies	**2**	**10**
Surgery for Bone dysplasia (Exostosis, OI, MED)	**2 & 3**	**10**
Pediatric Elbow Trauma Surgery (supracondylar, lateral condyle)	**2, 3 & 4**	**12**
Surgery for Osteomyelitis	**2, 3 & 4**	**12**

COMPETENCIES for Spine (Neurosurgery)

Competencies	Level of Competency	Number of Cases
History Taking	**4**	**30**
Physical Examination	**4**	**30**
Ordering Investigations	**4**	**30**
Interpreting Results	**4**	**30**
Deciding and Implementing Appropriate Treatment	**4**	**30**
Post-Operative Management and Monitoring	**4**	**30**
Presentation Skills: Short Case	**3 & 4**	**24**
Presentation Skills: Long Case	**3 & 4**	**12**
Use of Relevant Surgical Instruments	**3 & 4**	**30**
Spinal Fixation – Trauma	**1, 2 & 3**	**08**
Laminectomy	**1, 2 & 3**	**08**
Discectomy	**1 & 2**	**10**
Spinal Deformity Correction	**1 & 2**	**08**
Procedures for Degenerative Spine	**1, 2 & 3**	**08**
Procedures for Spine Infections (pyogenic, TB)	**1, 2 & 3**	**10**

Log Book -Record of Clinical Cases

Longitudinal evaluation (Logbook, Assignments, Assessments)

Throughout the length of the course the performance of the candidate will be recorded on the Log Book. Completed and duly certified logbook will form a part of the application for appearing in the final examination. The Log Book will reflect the performance of the candidate in the following parameters:

a. Entries in log book should be on regular basis, and signed by the supervisor, certifying the work.
b. Record of competence of technical skills.
c. Record of the assignments.
d. Record of affective and interpersonal behaviors.
e. Record of Journal clubs, conferences, lectures and workshops attended.

Table: Specimen from Log book

DATE	HOSPITAL No.	NAME, AGE, SEX	DIAGNOSIS	PROCEDURE PERFORMED	PERFORMANCE OF TRAINEE*	SIGNED BY IMMEDIATE SUPERVISOR

*Key 1) Observer Status 3) Performed under supervision
2) Assistant Status 4) Performed independently

Mandatory Workshops

During training candidate will attend the following mandatory workshops arranged by the University:

I. Communication skills

The aim is acquisition of the students with an art of communication for an effective doctor patient relationship, where the art of history taking and the skill of advice and instruction communication is pivotal. This with also enhance the interpersonal communication at the hospital amongst early colleges and those in various departments of the hospital setting. Furthermore, the appearance of our students in clinical meetings, workshops, conferences and seminars will be exceptionally didactic both as participants and as presenters. Furthermore, a better skill to communicate will empower the students to present better in their assessments for the very program, especially, OSPE, long case, short case and thesis defense.

II. Research methodology, Biostatics & Medical writing

As Research and recent advances are part and parcel of evidence-based practice, the university intends to endow in the students to raise intrigued healthcare professionals who intend to develop ease, both for the patient and the system by means of their queries and research. An elaborated session will provide a guideline as the first basic step towards thesis writing. Biostatistics will be introduced and statistics software introduction and basics workshop is carried out. Furthermore, the university provides the students with available Research and Biostatistics department as a continuum of guidance and help in their research works. Research Work is encouraged and a well-established ethical board and review committees for check of quality and virtues at all levels.

III. Computer and internet skills

Since literature review is the essence of research, an effective student must vest in him the recent updates in regards to the available search engines and gadgets, the software and platforms which lead to better understanding of topics. The aim of the workshop is to empower the students to better inquire for their research questions and to be able to avail the maximum out of the broad horizon of information available.

IV. Basic Life Support

Basic knowledge and skills for emergency situations in an unresponsive patient as per recent updates and protocols are delivered to the students, ensuring an up to the mark health care professional for the society at large. The workshops are well equipped and test the candidate both in knowledge and hands on.

V. Surgical skills

This workshop is the pivotal for the emerging surgeons and provides knowledge together with hands on practice. The students see, learn, perform and continue to implement well learnt basic practices over the course of the clinical training.

Candidate will be Certified of the above-mentioned workshops by the University.

ROTATIONS

In the five years' clinical course in the department of Orthopaedics mandatory rotation as an elective of twelve (12) months (three months each) may be selected subject to the availability of slot, discretion of the supervisor, and willingness of the PG Trainee. Rotation is carried out in the allied specialties and aids for better understanding of management strategies for ailments presenting to the subspecialties. Following rotations are offered:

- General Surgery
- Arthoplasty
- Hand (Plastic Surgery)
- Paediatric Orthopaedics (Paediatric Surgery)
- Spine (Neurosurgery)

Rotations will begin on the first of the month for the prescribed time periods. The student will be assessed and certified by the Supervisor for each rotation. The Learning Objectives of the Rotation and the aimed competencies are mentioned below:

Thesis

One of the training requirements for the Degree is to undertake a research and write a Thesis on a topic related to the field of specialization. Firstly, the student shall prepare a synopsis under guidance of his supervisor. The synopsis should be in accordance with the guidelines to Synopsis written recommended by the University. Synopsis of the research must be approved from the Ethical Review Board (ERB) and the Advanced study & research board (AS&RB) before starting the research work. During process of Research the resident has to submit study data/result of project on quarterly basis to the Department of Medical Education (DME) and Biostatistician. Once the research is commenced, an elaborative document of the guided structure, the Thesis, is then submitted for approval. The thesis must be submitted for approval during the beginning of fourth year of training program. After review by three external examiners, approval of thesis from AS&RB, the Resident can appear in the final examination. The Thesis is then to be subjected to a seminar of thesis defence. A candidate shall be eligible for defence of thesis examination whether he/she shall be declared pass or fail in the theory examination. Defence of thesis examination comprising of a presentation and question/Answer session with a panel of examination. A score of 70% or above will fulfill the passing criteria.

The guideline for synopsis and thesis writing is available on University website at

http://www.szabmu.edu.pk/content/downloads/guidelines-for-synopsis-writing.pdf
http://www.szabmu.edu.pk/content/downloads/guidelines-for-thesis-writing.pdf

The thesis submitted by all post graduate residents shall comply with the instructions and guidelines for Thesis writing issued by the University. It shall form a distinct contribution to knowledge and afford evidence of originality, shown by the discovery of new facts, by the exercise of independent critical judgment and / or by the invention of new methods of investigation. It shall not include research work for which a degree has already been conferred in this or any other university/college. In the wake of fundamental improvements being introduced in the system of Higher Education in Pakistan, the credit, respect, recognition of research and scholarly publications, career development and financial gains are now linked with such original works accomplished without replicating the efforts of other researchers. Students are guided to work in light of HEC Plagiarism policy and put original effort to light.

I. Thesis Evaluation

There shall be a standing list of External Examiners for each discipline consisting of persons of eminence in the respective field of research. The list shall be suggested from time to time by the Board of Studies of the Department/ Institute, Board of Faculty concerned and approved by the Research Board. The External Examiners will be requested to critically examine the thesis for its suitability for acceptance.

The candidate shall in the first instance submit four unbound copies of his/her complete thesis along

with an application on prescribed form for the evaluation of his/ her thesis, duly forwarded by his/her supervisor and the Head of Orthopaedics Department. The Vice Chancellor shall appoint three External Examiners from the approved list of External Examiners.

The reports of the examiners shall be placed before the Research Board for consideration. If two of the three Examiners find that the thesis is wholly inadequate it may be rejected by the Research Board.

If any of the examiners suggests modification/ revision of the thesis, the candidate shall be required to resubmit a revised version of the thesis duly certified by the supervisor, within one year (in case of Major Correction). The revised version of the thesis shall be approved by the same examiners (s) who suggested modification/ revision of the thesis (in case of Major Correction).

If any examiner finds the thesis adequate but suggests minor modification/ revision, this may be incorporated without referring again to the examiners. However, supervisor will recommend the correction.

The candidate will submit the research thesis in the final year of training, six months before completion of the training.

II. Thesis Evaluation Criteria for AS & RB

In pursuance of recommendations of Academic Council, decisions were taken about thesis evaluation of MS Orthopaedics thesis. Three (03) copies of thesis will be sent to three (03) external examiners for evaluation (28th February for Aug/Sep exam & 31st August for Mar/Apr Exam). In consideration of thesis evaluation reports, the Board's decision for thesis evaluation is as follows:

- If three examiners have accepted thesis with minor correction in present/accepted form thesis should be sent to the Advanced Studies & Research Boards (AS & RB) for further necessary action.
- In case two external examiners accepted thesis as minor in present/accepted form and third examiner reject the thesis, all thesis report will be rejected, and student must rewrite thesis.
- In case of two minor and one major corrections student will resubmit the thesis after three months.
- Time required for Thesis evaluation is within one year.

ASSESSMENT

ASSESSMENT

Assessment of trainees will cover the cognitive, psychomotor and affective domains. It will take two forms:

- Formative Assessment
- Summative Assessment

Formative Assessment

It is the continuous assessment of progress and competence. It will be conducted through workplace-based assessment throughout the training. Assessment will be undertaken by a range of assessors and will cover a range of procedures appropriate to the stage of training. Formative assessment will include:

- Directly observed practical skills (DOPS)
- Case based discussion (CbD)
- Mini clinical examination exercises (Mini-CEX)
- Multiple source feedback (MSF)

Residents will be evaluated by Supervisor quarterly throughout the Residency according to the syllabus/curriculum and report will be submitted to the Registrar office. A specified template form is used to submit the report (Annexure).

Summative Assessment

Summative assessment will be held twice:

1. Mid Term Assessment (MTA) Examination (At the end of 2nd year)
2. Final/Exit Examination (At the end of Final Year)

The level of performance required for passing the exam will depend on the knowledge and skills necessary for acceptable performance and will not be adjusted to regulate the number or proportion of persons passing the examination. The pass point will be determined by careful analysis and judgment of acceptable performance.

STANDARD ASSESSMENT PROTOCOLS / FORMAT OF EXAMINATIONS

Mid Term Assessment (MTA)

The Mid Term Assessment (MTA) examination is mandatory eligibility requirement for all Postgraduate Final examinations. Candidates are required to have passed MS Part-I, complete two years training in Orthopaedics, get approval of their Synopsis from AS&RB and take the MTA Examination. In case of failure in the MTA examination, the trainees are permitted to continue their training but must pass the MTA examination prior to appear in the final examination.

Format of Examination

MTA Examination consists of the following components:

ASSESSMENT		
Written	Paper:100 One Best MCQs (100 Marks) **Part-A:** 50% MCQs from General Principles **Part-B:** 50% MCQs from Specialty Oriented	Pass Marks 60% Aggregate and Not Less than 55% in any Part (A Or B)
Assessment of Clinical & Technical Skills (ACTS/OSCE)	100 Marks 8-12 Stations	Pass Marks 60%
Total Marks		**200**

Format of Mid Term Assessment (MTA)

1. **Multiple Choice Questions (MCQs)**

   The MTA comprises of two parts; A and B. Each MCQ carries 2 marks. There is no negative marking. MCQs are choose the best one type. Time available is minutes for each paper with a gap of minutes in between both A and B papers.

   - Paper A comprises of 50 MCQs from Surgery in General.
   - Paper B comprises of 50 MCQs from Allied specialties.

2. Assessment of Clinical & Technical Skills (ACTS/OSCE)

- **Eligibility**

A candidate shall be eligible for the ACTS/OSCE after passing MTA examination. He can avail three consecutive clinical examinations after passing the exam.

A candidate availing/missed all the three consecutive chances of clinical examination after passing an MTA examination, he shall appear again in the theory examination.

- **Format**

ACTS/ OSCE will comprise of 12-18 stations of 5 to 8 minutes each with a change time of one minute for the candidate to move from one station to the other. The stations would have an examiner, a patient or both. Structured clinical tasks will be set at each station. The examiners using a global rating scale will assess the performance of each candidate. On stations where no examiner is present the candidates will have to submit written responses to short answer questions on a response sheet. There will be two types of stations: static and interactive. On static stations the candidate will be presented with patient data, a clinical problem or a research study and will be asked to give written responses to questions asked. In the interactive stations the candidate will have to perform a procedure, for example, taking history, performing clinical examination, counseling, assembling an instrument etc. One examiner will be present at each interactive station and will either rate the performance of the candidate or ask questions testing reasoning and problem-solving skills.

Final Postgraduate Examination

Final Postgraduate examination of MS Orthopaedics is comprising of following three (03) main components:

1. Theory Examination
2. OSCE & Clinical Examination
3. Defence of Thesis

1. Theory Examination

- **Format & Passing Criteria**

Paper	Type	Marks	Duration	Passing Criteria
Paper – I	One Best Type MCQ Paper	100	03 Hours	75 % in Aggregate and Not Less than 70% in any Paper
Paper – II	One Best Type MCQ Paper	100	03 Hours	

2. OSCE & Clinical Examinations

- **Eligibility**

A candidate shall be eligible for the OSCE & Clinical Examination after passing theory examination. He can avail three consecutive clinical examinations after passing a final theory examination.

A candidate availing/missed all the three consecutive chances of clinical examination after passing a theory examination, he shall appear again in the theory examination

- **Format & Passing Criteria**

OSCE & Clinical Examination is comprising of three components

i. OSCE
ii. Long Case
iii. Short Case

i. Format of OSCE

Observed Structured Clinical Examination (OSCE) will comprise of 12-18 stations of 5 to 8 minutes each with a change time of one minute for the candidate to move from one station to the other. The stations would have an examiner, a patient or both. Structured clinical tasks will be set at each station. The examiners using a global rating scale will assess the performance of each candidate. On stations where no examiner is present the candidates will have to submit written responses to short answer questions on a response sheet. There will be two types of stations: static and interactive. On static stations the candidate will be presented with patient data, a clinical problem or a research study and will be asked to give written responses to questions asked. In the interactive stations the candidate will have to perform a procedure, for example, taking history, performing clinical examination, counseling, assembling an instrument etc. One examiner will be present at each interactive station and will either rate the performance of the candidate or ask questions testing reasoning and problem-solving skills.

ii. Format of long case

For assessment of the holistic approach of the candidate regarding patient management, each candidate will be allotted one long case and allowed 30 minutes for history taking and clinical examination. Candidates should take a careful history from the patient (or relative) and after a thorough physical examination identify the problems which the patient presents with. During the period a pair of examiners will observe the candidate. In this section the candidates will be assessed on the following areas:

- **Interviewing skills**
  - Introduces one self. Listens patiently and is polite with the patient.
  - Is able to extract relevant information.
- **Clinical examination skills**
  - Takes informed consent
  - Uses correct clinical methods systematically (including appropriate exposure and re-draping).
- **Case presentation/ discussion**
  - Presents skillfully
  - Gives correct findings.
  - Gives logical interpretations of findings and discusses differential diagnosis.
  - Enumerates and justifies relevant investigations.
  - Outlines and justifies treatment plan (including rehabilitation).
  - Discusses prevention and prognosis.
  - Has knowledge of recent advances relevant to the case.
  - During case discussion the candidate may ask the examiners for laboratory investigations which shall be provided, if available. Even if they are not available and are relevant, candidates will receive credit for the suggestion.

iii. Format of short cases

Candidates will be examined in at least four short cases for a total of 40 minutes jointly by a pair of examiners. Candidates will be given a specific task to perform on patients, one case at a time. During this part of the examination, the candidate will be assessed in:

- **Clinical examination skills**
  - Takes informed consent.
  - Uses correct clinical methods including appropriate exposure and re-draping.
  - Examines systematically.

- **Discussion**
  - Gives correct findings.
  - Gives logical interpretations of findings.

- Justifies diagnosis/es.
- As the time for this section is short, the answers given by the candidates should be precise, succinct and relevant to the patient under discussion.

Component	Protocol Description	Marks	Duration	Passing Criteria
OSCE	8-12 Stations 60% Interactive 40% Static	100	5 to 6 minutes per stations	60% in Aggregate and Not Less than 55% in any Paper
Long Case	One (01) Case	100	50 Minutes	
Short Case	Four (04) Case	100	40 Minutes (10 Minutes for each case)	

If a candidate securing 60% or more marks in OSCE component He/She shall be exempted from this component in the next clinical examination until & unless he reappears in the theory examination.

3. Defence of Thesis

- **Eligibility**

A candidate shall be eligible for defence of thesis examination whether he/she shall be declared pass or fail in the theory examination

- **Format of Examination**

Defence of thesis examination comprising of a presentation and question/Answer session with a panel of examination.

- **Passing criteria**

A score of 70% or above marks is required to pass.

If a candidate shall be declared pass in the Defence of thesis examination, he/she shall be exempted from this component forever. Provisional Certificate, Transcript and Degree will be awarded only after passing all the components of the final MS Orthopaedics examination.

LEARNING RESOURCES

LEARNING RESOURCES

List of Essential Readings

Books:

Latest edition of the all of the following books:

1. Miller's Review of Orthopaedics- 7th Edition
2. Handbook of Fractures- 4th Edition
3. Campbell's Operative Orthopaedics- 14th Edition (4 Volumes set)
4. Orthobullets (11 Volumes set)

Journals:

Issues of last two years of the following journals

- Journal of American Academy of Orthopedic Surgeon (JAAOS)
- Journal of Pakistan Orthopaedic Association (JPOA)
- Journal of College of Physicians and Surgeons Pakistan (JCPSP)

ANNEXURE

Supervisor Evaluation Form

SUPERVISOR'S INTERNAL ASSESMENT/EVALUATION PROFORMA FOR MS

PGR Name: _____ Session: _____ Specialty: _____

University Registration No: _____

Period: From_____ To _____

1.	Generic Competencies			
	(Please score from 1 - 100. 75% shall be the pass marks)		Component Score	Score achieved
		Patient Care	20	
		Medical Knowledge and Research	20	
	i	Practice and System Based Learning • Journal Clubs	04	
	• Audit Projects		04	
	• Medical Error Investigation and Root Cause Analysis • Morbidity / Mortality / Review meetings		04	
	• Awareness of Health Care Facilities		04	
			04	
	iv. Communication Skills		10	
	• Informed Consent • End of life decisions		10	
	v. Professionalism		04	
	• Punctuality and time keeping		04	
	• Patient doctor relationship		04	
	• Relationship with colleagues		04	
	• Awareness of ethical issues		04	
	• Honesty and integrity		04	
2.	Specialty specific competencies			
	Please score from 1 - 100. 75% shall be the pass marks			Score achieved
	Operative Skills / Procedural Skills			

3.	**Multisource Feedback Evaluation**(Please score from 1 - 100. 75% shall be the pass marks)		
4.	**Candidates Training Portfolio** (Please score from 1 - 100.75% shall be the pass marks)		
	(Please score from 1 -100. 75% shall be the pass marks)	Component Score	Score achieved
	I. Log book of operations and procedures	**25**	
	II. Record of participation and presentation in academic activities	**25**	
	III. Record of publications	**25**	
	IV. Record of results of assessments and examinations	**25**	

Total marks obtained _____ Signature of Supervisor _____

Name & Stamp _____