MINISTRY OF HEALTH AND SPORTS

DEPARTMENT OF HUMAN RESOURCES FOR HEALTH

PROPOSED CURRICULUM

FOR THE DEGREE OF

MASTER OF MEDICAL SCIENCE IN ORTHOPAEDICS

Submitted to the Academic Board of Medical Universities

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University of Medicine, Mandalay
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CONTENT

Curriculum

Governance

1. Title of the course

Master of Medical Science in Orthopaedics:
M.Med.Sc (Orthopaedics) course

2. Preamble

Myanmar with its new government policy for prioritization of socio-economic development, educational and health pillar development are important social drive for the national plan. As a member country, Myanmar will be kept in abreast with other regional countries for different sectors development.

According to the national health statistics in 2012, Trauma becomes the public interest of leading disabilities and death. At the same time orthopaedics is one of the most dynamically changed current interest in term of quality as well as quantity. In compare to recently developing neighboring countries, Myanmar has only less than 500 orthpaedic surgeons which ratio the 1 in 100,000 population. It is also admitted to express comparatively low quality care for the people with various reasons, of which low standard of education and training system and inadequacy of human resources in relation to actual workload. That show very clearly that it need to improve both quality standard and recruit more qualified surgeon as Orthopaedics is rapidly growing wide subject, to acquire the comprehensive package of knowledge and acceptable standard of competency skill, it should have enough period of course duration and reliable educational and training system.

With the permission of four year master course, it needs to revise the curriculum fulfilling the expected quality standard of competent full fledged surgeon. For which it is necessary to learn from original discussion points. For this new curriculum for orthopaedics education it needs trainees to go through structured and integrated program of learning environment.

3. Aim and Objectives

Aim

To produce a "competent orthopaedic surgeon" with assured basic quality and safety for the patient community and also inspiring the lifelong learning attitude and professional responsibility.

Objectives

(1) To ensure trainees progress through an integrated program which provide them with increasing professional responsibilities and quality under appropriate supervision, coaching, and mentoring in order to acquire the minimal ***level of competency***[1], needed to become ***a full fledged surgeon***[2] able to practice independently, safely and confidently or as a part of multidisciplinary team, in a range of different clinical settings

(2) To be a higher post graduate degree in the profession with comprehensive structured three years course compatible with international standard.

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[1] Nine key ***competencies*** for a full fledged surgeon which need to accredited

1. Access the credibility of education and training resources, facilities and system by teachers and students
2. Improve technical expertise with good clinical governance for quality and safety
3. Improving clinical judgment with logical thinking to get the correct decision making
4. Attaining the professional responsiveness, etiquette and ethics
5. Containment of the professionals with continuum of scholarship and skill based training program
6. Able to understand the health information statistics and research design
7. Need to build up the team capacity and managed care
8. Able to practice the behavior change communication skill
9. Managerial and leadership role in the profession or community

[2] Code of conduct for a ***full fledged surgeon***

- I pledge to always act in the best interest of my patients, respecting their autonomy and right
- I do understand myself to improve knowledge and skill, evaluate and reflect on my job
- I agree to continue learning and teaching for the benefits of my patients, my trainees and my community
- I will be respectful of my colleagues and readily offer them my best help and effort
- I will abide the code of conduct of Myanmar Medical Council for good medical practice
- I myself and render others do not allow personal benefits, popularity, rewards and incentives or carrier advancement to compromise my judgments and or the care I provide
- I accept the responsibility and challenges of being a good surgeon and fellow of my medical university

At the end of the four year training program, the residents have to be competent in:

1. **Patient care** with full compassion, appropriate and effective treatment and promotion of health
2. **Medical knowledge** based on established and evolving biomedical, clinical, epidemiological and social behavioural sciences with ability to apply for patient care
3. **Practice based learning and improvement** with ability to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices
4. **Interpersonal and communication skills** resulting in effective information exchange and teaming with patients, their families and professional associates
5. **Professionalism** with full commitment to professional responsibilities, adherence to ethical principles and sensitivity to a diverse patient population
6. **System based practice** with awareness of and responsiveness to the larger context and system of health care with optimal value of resources

Level of competency

Level of competency in individual domain which has to be clearly defined with training year basis. Level 1 to 4 is to be applied in orthopaedic residency training program. (Level 5 is to be applied in fellowship program.)

Medical knowledge competency

Level 1: Understand scientific basis and principles
Level 2: Demonstrate knowledge with clinical applications
Level 3: Thorough knowledge with ability to demonstrate strategic thinking and decision making
Level 4: Demonstrate comprehensive knowledge including complexity and current update
Level 5: Perform clinical research and teach others

Patient care competency

Level 1: Identify, assess and recognize the clinical problem with appropriate information and communication and recording
Level 2: Able to prioritize, timely intervention or consultation and participation in treatment team
Level 3: Able to develop treatment plan and perform according to working protocol under supervision
Level 4: Implement appropriate total care independently
Level 5: Ability to perform comprehensive care including complex situations as a leader

PBLI competency

Level 1: Identify strength, deficiency, and limits in one's knowledge and expertise
Level 2: Assess patient outcomes and complications in one's own practice
Level 3: Set learning and improvement goals
Level 4: Identify and perform appropriate learning activities
Level 5: Use information technology to optimise learning and improved patient outcomes

Interpersonal and communication skills competency

Level 1: Communicate effectively with patients and family
Level 2: Provide detailed information about patient care
Level 3: Communicates competently in difficult patient circumstances
Level 4: Intercedes and resolves existing interpersonal conflicts
Level 5: Demonstrate leadership in communication activities

Professionalism competency

Level 1: Demonstrate behaviour that conveys caring, honesty, and genuine interest in patients and families

Level 2: Demonstrate and understanding of the importance of compassion, integrity, respect, sensitivity and responsiveness

Level 3: Exhibit these attitudes consistently in complex and complicated situations

Level 4: Develops and uses an integrated and coherent approach to understanding and effectively working with others

Level 5: Demonstrate the leadership and mentoring regarding these principles of bioethics

System based practice competency

Level 1: Recognise importance of complete and timely documentations

Level 2: Uses checklists and briefings to prevent adverse events in health care

Level 3: Participate in quality improvement or patient safety program and or project

Level 4: Incorporate clinical quality improvement and patient safety into clinical practice

Level 5: Lead local or regional quality improvement project including publications on that matters

4. Duration of the Course

The duration of the course for master degree is four academic years in general.

Description of the Course

It is a four years course. The training is competency based and delivered through structured or organized training programme (module based system). The nature of training is basically training cum service and is supervised by competent trainers.

It will reflect promotive, preventive, curative and rehabilitative aspects of the common orthopaedic problems in Myanmar. It will include both cognitive and performance skills, correlation of knowledge and application of basic science principles. Emphasis will be placed on knowledge & skills in clinical medicine which will include the knowledge of current concepts, trends and changing trends in both diagnostic and therapeutic aspects. The candidate's thinking power with ability to appraise, discriminate and evaluate, as well as to draw logical conclusions from available information and data will be promoted and aimed for. The candidate must also be skillful in the commonly used diagnostic & therapeutic procedures.

However, in view of the widening role of the health care provider, in response to the changing and increasing health needs of the community in general, the trainee will also be made familiar with relevant aspects of management science, hospital economics, auditing, and communication skills.

The nature of the training is of an exit type where the graduate is considered to have achieved relevant competencies, clinical thinking process and appropriate attitudes to be eligible for the post of a registered orthopaedic surgeon.

It is also expected that, having been exposed to common orthopaedic specialties during the training period, he has developed potential for specialization with appropriate further training if and when required.

5. Training Programme

5.1 Contents

The course structure is modules based.
There are (31) modules within four academic years.
Candidates will be posted in orthopaedic wards, hand surgical unit, spine unit in orthopaedic hospital and paediatric orthopaedic unit in children's hospital. They will also be posted in orthopaedic trauma unit in general hospital including (24) hours duty roster.

Clinical rotation for each year will be posted as follows:

Year-1 (6 modules)

ORTH-1010	Orthopaedic Trauma (1)	3 months
ORTH-1020	General Orthopaedics (1)	3 months
ORTH-1030	Hand Surgery (1)	1 month)
ORTH-1040	Paediatric Orthopaedics (1)	1 month)
ORTH-1050	Orthopaedic Surgery of the Spine (1)	1 month)
ORTH-1120	General Surgical Principles	3 months

Year-2 (8 modules)

ORTH-2010	Orthopaedic Trauma (2)	3 months
ORTH-2020	General Orthopaedics (2)	3 months
ORTH-2030	Hand Surgery (2)	1 month)
ORTH-2040	Paediatric Orthopaedics (2)	1 month)
ORTH-2050	Orthopaedic Surgery of the Spine (2)	1 month)
ORTH-2060	Adult Reconstructive Orthopaedics (1)	1 month
ORTH-2070	Musculoskeletal Oncology (1)	1 month
ORTH-2130	EmergencyMedicine and ICU	1 month

Year-3 (9 modules)

ORTH-3010	Orthopaedic Trauma (3)	3 months
ORTH-3030	Hand Surgery (3)	1 month)
ORTH-3040	Paediatric Orthopaedics (3)	1 month)
ORTH-3050	Orthopaedic Surgery of the Spine (3)	1 month)
ORTH-3060	Adult Reconstructive Orthopaedics (2)	1 month
ORTH-3070	Musculoskeletal Oncology (2)	2 months
ORTH-3080	Orthopaedic Sports Medicine	1 month
ORTH-3090	Foot and Ankle Orthopaedics	1 month
ORTH-3140	NSU & Rehabilitation	1 month

Year-4 (8 modules)

ORTH-4010	Orthopaedic Trauma (4)	3 months
ORTH-4030	Hand Surgery (4)	1 month)
ORTH-4040	Paediatric Orthopaedics (4)	1 month)
ORTH-4050	Orthopaedic Surgery of the Spine (4)	1 month)
ORTH-4060	Adult Reconstructive Orthopaedics (3)	1 month
ORTH-4100	Shoulder and Elbow Surgery	1 month
ORTH-4110	Community Orthopaedics	1 month
ORTH-4150	Elective & Research	3 month

Four years course schedule

Rotation	Duration
Orthopaedic Trauma	Twelve (12) months
General Orthopaedics	Six (6) months
Hand Surgery	Four (4) months
Paediatric Orthopaedics	Four (4) months
Orthopaedic Surgery of the Spine	Four (4) months
Adult Reconstructive Orthopaedics	Three (3) months
Musculoskeletal Oncology	Three (3) months
Orthopaedic Sports Medicine	One (1) month
Foot and Ankle Orthopaedics	One (1) month
Shoulder and Elbow Surgery	One (1) month
Community Orthopaedics	One (1) month
General Surgical Principles	Three (3) months
EmergencyMedicine and ICU	One (1) month
NSU & Rehabilitation	One (1) month
Elective & Research	Three (3) months
Total	Four years (48 months)

12 months clinical rotation for every candidate for a clinical academic one year (equitable distribution)

Competency level is applied for each modules as follows:

Modules	Year-1	Year-2	Year-3	Year-4
ORTH-1010 Orthopaedic Trauma (1) - Basic science + Principles of trauma - Regional trauma (8 regions) (classification + biomechanics)	Level 1			
ORTH-2010 Orthopaedic Trauma (2) - Regional Trauma (problem identification/ planning/ primary care)		Level 2		
ORTH-3010 Orthopaedic Trauma (3) - Regional Trauma (decision making/ care under supervision)			Level 3	
ORTH-4010 Orthopaedic Trauma (4) - Regional Trauma (evidence based practice)				Level 4
ORTH-1020 General Orthopaedics (1) - Principles of orthopaedics - Infections/ inflammation/ degeneratives/ metabolic/ tumors (aetiology, pathophysiology, clinical presentation, history taking, physical examination, investigations, primary treatment)	Level 1+2			
ORTH-2020 General Orthopaedics (2) - Decision making, treatment planning and care, evidence based		Level 3+4		

ORTH-1030 Hand Surgery (1) - Basic science and principles of hand surgery (Injury and disorders of bones & joints, tendons, nerves, vessels)	Level 1			
ORTH-2030 Hand Surgery (2) - correlation between pathology and clinical presentation, treatment plan and justification		Level 2		
ORTH-3030 Hand Surgery (3) - Decision making, patient care			Level 3	
ORTH-4030 Hand Surgery (4) - Scientific reasoning and evidence based care				Level 4
ORTH-1040 Paediatric Orthopaedics (1) - Basic science and principles of paediatric orthopaedics (Injury and disorders of bones & joints, tendons, nerves, vessels)	Level 1			
ORTH-2040 Paediatric Orthopaedics (2) - correlation between pathology and clinical presentation, treatment plan and justification		Level 2		
ORTH-3040 Paediatric Orthopaedics (3) - Decision making, patient care			Level 3	
ORTH-4040 Paediatric Orthopaedics (4) - Scientific reasoning and evidence based care				Level 4
ORTH-1050 Orthopaedic Surgery of the Spine (1) - Basic science and principles of orthopaedic surgery of the spine (Injury and disorders of bones & joints, tendons, nerves, vessels)	Level 1			
ORTH-2050 Orthopaedic Surgery of the Spine (2) - correlation between pathology and clinical presentation, treatment plan and justification		Level 2		
ORTH-3050 Orthopaedic Surgery of the Spine (3) - Decision making, patient care			Level 3	
ORTH-4050 Orthopaedic Surgery of the Spine (4) - Scientific reasoning and evidence based care				Level 4
ORTH-2060 Adult Reconstructive Orthopaedics (1) - Basic science and principles of joint surgery - Biomechanics, Biomaterials		Level 1		
ORTH-3060 Adult Reconstructive Orthopaedics (2) - Correlation between pathology and clinical presentation, treatment plan and justification, - Decision making, patient care			Level 2+3	
ORTH-4060 Adult Reconstructive Orthopaedics (3) - Scientific reasoning and evidence based care				Level 4
ORTH-2070 Musculoskeletal Oncology (1) - Basic science and principles of bone and soft tissue tumors (correlation between pathology and clinical presentation, treatment plan and justification)		Level 1+2		

ORTH-3070 Musculoskeletal Oncology (2) - Decision making , patient care - Scientific reasoning and evidence based care			Level 3+4	
ORTH-3080 Orthopaedic Sports Medicine - Basic science and principle of orthopaedic sports medicine - Correlation between pathology and clinical presentation, treatment plan and justification			Level 1+2	
ORTH-3090 Foot and Ankle Orthopaedics - Basic science and principle of foot and ankle orthopaedics - Correlation between pathology and clinical presentation, treatment plan and justification			Level 1+2	
ORTH-4100 Shoulder and Elbow Surgery - Basic science and principle of shoulder and elbow surgery - Correlation between pathology and clinical presentation, treatment plan and justification				Level 1+2
ORTH-4110 Community Orthopaedics - Assigned project				
ORTH-1120 General Surgical Principles - Basic science and principle of general surgery, clinical diagnosis and treatment of emergency surgical conditions	Level 3			
ORTH-2130 EmergencyMedicine and ICU - ATLS - Critical care		Level 3		
ORTH-3140 NSU & Rehabilitation - Principle of neuro imaging, electro diagnosis - Trauma and orthopaedic rehabilitation			Level 3	
ORTH-4150 Elective & Research				

5.2 Learning Teaching Methods

No.	Methods	Materials
1	Didactic Presentation / Interactive Learning	Basic science / Technology Conceptual knowledge and Basic skill / Journal Club
2	Clinical / Technical Skill Teaching	OPD, Ward rounds, Emergency and Elective Operations, Critical Care, Case conference, Audit
3	OSCE / OSATS / Simulation	Scenarios, Presentation style, Thinking process, Decision Making, Problem Solving, Communication Skill, Histo-pathological specimen club, X-ray Clinic, Ethics and Professionalism
4	Portfolio	Log book, Duty assignment, Case summary report, Critical review / Literature search, Society activities, CME (Seminar, Conference, Workshop, Guest Lectures)
5	Continuing Professional Development	Leadership, Total Quality Management, Patient Safety, Risk Analysis and Management, Peer Review, Communication Skill, Orthopaedic Economics

Additional requirements during training

Courses

Compulsory courses

- ATLS/ PTC
- Basic Surgical Skill Course
- Basic Orthopaedic Skill Course
- AO Principle of fracture fixation Course

Optional courses

- AO Principle of Spine Course
- Basic Arthroplasty Course
- Basic Hand Course
- Basic Paediatric Course
- Basic Arthroscopy Course
- Basic Instructional Course for Microsurgery
- Illizharov Course
- Flap Course

6. Assessment

6.1 Formative Assessment

Continuous Work Based Assessment

Continuous work based assessment after the end of each clinical rotation with instructional work sheets and reporter feed back (assessor must grade outstanding, satisfy and unsatisfy).

General principle for acceptable level of qualification

After the end of clinical rotation, the residents have to be graded by following evaluation format and scoring system.

		Unsatisfy	**Satisfy**	**Superior**
Patient Care	(I/C)	1 2 3	4 5 6	7 8 9
Medical Knowledge	(I/C)	1 2 3	4 5 6	7 8 9
PBLI	(I/C)	1 2 3	4 5 6	7 8 9
Interpersonal & Communication skill	(I/C)	1 2 3	4 5 6	7 8 9
Professionalism	(I/C)	1 2 3	4 5 6	7 8 9
System-based practice	(I/C)	1 2 3	4 5 6	7 8 9
Overall clinical competence	**(I/C)**	**1 2 3**	**4 5 6**	**7 8 9**

I/C = Insufficient contact to judge (Inability to score)

Student feedback and reporter feedback and reflection on conditions are made infront of the head of department as course director.

Remedial action for unsatisfied resident or marginally performed resident (ie 4 or less) who have to be compensated with more clinical attachment time with trainers till satisfactory feedback outcome while carrying on taking next module .

Instruments of Continuous Work Based Assessment

- Mini Clinical Evaluation Exercise (Mini-CEX)
- Direct Observation of Procedual Skills (DOPS)
- Case-based Discussion (CbD)
- Multi-Source Feedback (MSF) or 360 Degrees Evaluation or Peer Assessment Tool
- The Objective Structured Long Examination Record (OSLER)

Assessment of six competencies

Patient care

- Clinical rotation evaluation form (check list, global rating scale) in both inpatient and ambulatory care at the end of the rotation
- Direct observed history, physical examination, and communication
- Patient and procedure logs

Medical knowledge

- OITE (Formative as well as summative)
- Evidence-based medical journal log
- Chart-stimulated recall

Practice based learning and improvement

- Portfolio
- Clinical question log (problem based scientific reasoning)

Interpersonal and communication skill
- Direct observe history and patient communication
- Multi source evaluations and surveys (360 degree feed back)
- Trainee reflection on peer and patient feedback

Professionalism
- Multi source evaluations and surveys (360 degree feed back)
- Critical incidences and praised cards (medical emergency, unusual condition, difficult situation, communication problem with patient interaction)

System based practice
- Assessment of team work skills
- Project on system error, including critical incidence analysis (ie. self questioning practice in personal view, perception, appropriate action plan and how to avoid and overcome similar situation in future)

Orthopaedic In-Training Examination (OITE)
At the end of each academic year except Year-4, there will be OITE.
It is a three hour multiple choice questions type of written assessment.

SBA (Single Best Answer)	60 sets	60 marks
EMQ (Extended Matching)	60 sets	60 marks
Total		120 marks

Results of three OITE will be 50% of written assessment of the exit examination.

Combined Mock Examination
Combined Mock Examination will be on three months before the exit examination.
The format of assessment should be the same as the exit examination.
Two compartments

Day 1 - Written assessment: MSQ x 10 Qs (3 hours)
(Including 2 modified essay questions on problem based scenario with clinical implication)
Day 2 - Clinical assessment (OSCE 15 stations + 3 preparation stations each of 10 minutes)

Feedback will be given to the candidate.

6.2 Summative Assessment, Log Book

Summation of modular evaluation scores for Year-1, 2 and 3 (Satisfy or Unsatisfy)
If satisfy, proceed to next academic year rotation.
If unsatisfy, notify the respective resident with remedial plan for 3-6 months and re-evaluate and monthly report to the board of authority. If satisfy, proceed to next academic year rotation.
If still unsatisfy, return to unit (RTU) in accordance with institutional rules and regulations.

Summation of modular evaluation scores for Year-4 (Satisfy or Unsatisfy)
If satisfy, proceed to the Exit Examination (six monthly regular exit examination).
If unsatisfy, notify the respective resident with remedial plan for 3-6 months and re-evaluate and monthly report to the board of authority. If satisfy, proceed to Exit Examination.
If still unsatisfy, return to unit (RTU) in accordance with institutional rules and regulations.

Summative Assessment (The Exit Examination)

Summative Assessment will be conducted on end of Year-4.
There will be four compartments in Summative Assessment.

(1). Written assessment
(2). Clinical assessment
(3). Portfolio assessment and
(4). Dissertation assessment.

Assessment Design

Day (1): Written assessment

Time allowed 3 hours (180 minutes)
Question design

Two modified essays (trauma / orthopedic problem case scenario discussion) and
Eight multiple short questions (designed to problem based conceptual knowledge and decision making capacity in individual problem including Hand, Paediatrics and Spine)

Day (2): Clinical Assessment

Time allowed 3 hours (180 minutes)
It is an OSCE format. OSCEs comprise a series of stations in a circuit around which the candidates rotate. There are 15 stations and 3 preparation stations (10 minutes each). Candidates will start at different points in the circuit. At each station the candidate is required to undertake a clearly defined task. One minute is allowed between stations for circulation from one station to the next. This also allows the examiners to complete the mark sheet for each candidate and for the patient or simulated patient to prepare for the next candidate. At each station there are clearly defined instructions for the candidate, which briefly outline the scenario and describe the task that the candidate is required to undertake.

The individual stations are grouped into four broad content areas. These are:

- **Surgical pathology** (1 station)
  One station – manned
  There is questioning of surgical pathology on given specimen.

- **Applied surgical science and critical care** (4 stations)
  Four stations – all are manned stations test the application of pathophysiological processes in given emergency problem (critical care), free surgical talk (focus on advanced surgical techniques or current roles of management of trauma or orthopaedic problems), the interpretation of the clinical data including histopathology report/ slides and laboratory results and the identification / interpretation of the x-rays films.

- **Communication skills** (3 stations)
  Three stations – all manned
  One station – history taking in Orthopaedics (direct observations assess for how to deal with patient, and logical approach towards the probable anatomical and pathological stage with expectation of prognosis and line of diagnostic strategies).
  Two stations examine skills such as talking with colleague and relatives (counseling of the patient), ethics and professionalism (example: comment on ethical or un-ethical conduct).

Talking with relatives and carers
For this the candidate will typically have a preparation station which will involve extracting information from a set of hospital notes and then having an interview with a patient, their relative or a carer. Two examiners are used for this assessment, one of which will be a fully trained lay examiner who will have been a patient and will be able to assess the non-scientific communication skill of the candidate.

Communicating with colleagues
Again a preparation station is used in which the candidate is asked to extract information from a set of case notes. They then have a telephone conversation with an examiner who will be playing the role of a colleague. Typical scenarios might involve any situation where a surgical trainee needs to discuss a patient with a senior colleague such as planning management of a deteriorating patient or organising a transfer to a regional centre. These stations are marked by a single examiner.

- **Clinical and procedural skills** (7 stations)

Five focus physical examination stations – all manned
Focus physical examinations on orthopaedic and trauma cases, regional & disease varieties, systematic method of quick & relevant physical examination, interpretation of findings and most probable diagnosis (may need to change the case if necessary - every 6 candidates)

Two procedural skills stations – all manned
Tests the identification and usage of basic orthopaedic equipments and specific surgical techniques & tools.

For the purposes of designing the stations domains are used to help construct questions ensuring that the important areas as identified by the GMC's "Good Medical Practice" are adequately covered by the examination. These domains are:

- Clinical knowledge and its application
- Clinical and technical skills
- Professionalism including decision making, problem solving, situational awareness and judgement, organisation, planning and patient safety
- Communication.

Each station is marked out of a total of 20. Rather than ***an itemised check list*** approach the marking scheme allocates a proportion of the marks at each station to two or more of the above domains which can be evaluated within the context of each scenario.

The diagram below illustrates the assessment grid and marking matrix for the stations of the OSCE, illustrating broad content areas and the examined domains. The weighting of marks for each component is provided.

MMedSc (Ortho) OSCE assessment grid and matrix	Surgical pathology	Applied surgical science and critical care					Communication skills					Clinical and procedural Skill						
							Giving and receiving information				History taking	Physical examination					Procedural skills	
	Surgical pathology	Interpretation of data (X-ray)	Surgical talk	Interpretation of clinical data	Preparation station	Critical care management	Preparation station	Talking with relatives & carers	Preparation station	Communicating with colleagues	History taking (orthopaedics)	Focus examination 1	Focus examination 2	Focus examination 3	Focus examination 4	Focus examination 5	Basic instrument	Specific technique
Examiners required ⇨	one	one	one	one	-	two	-	one + lay	-	one	two	one	one	one	one	one	one	one
Domains tested ⇩																		
Clinical knowledge and its application	16	20	16	12		8		4		4	4	4	4	4	4	4	20	4
Clinical and technical skill	-	-	-	4		4		-		-	8	8	8	8	8	8	-	12
Communication	-	-	-	-		4		12		8	4	4	4	4	4	4	-	-
Professionalism decision making, problem solving, situational awareness and judgement, organization and planning, patient safety	4	-	4	4		4		4		8	4	4	4	4	4	4	-	4
Total mark	20	20	20	20		20		20		20	20	20	20	20	20	20	20	20

The OSCE structure and the distribution of marks for each station are shown above. This approach ensures an appropriate distribution of marks across the broad content areas. Note that although communication skills is a separate broad content area it is also a domain assessed in the majority of the other stations.

Each individual station is assessed in two ways. Using a structured mark sheet a mark is awarded for each domain using generic descriptors to identify and guide examiners in allocation of the marks. In addition, an overall judgement is made on the candidate's performance at the station as a whole (Pass, Borderline or Fail). Thus for each station the candidates will have a mark out of 20 and an overall judgement of their performance.

Example: in focus physical examination station

Clinical knowledge and its application	4 marks
Clinical and technical skills (4 marks x 2)	8 marks
Professionalism	4 marks
Communication	4 marks = Total 20 marks

(Fail = 1, Borderline Fail = 2, Boderline Pass = 3, Pass = 4)

The marks and global ratings are then employed in order to construct the overall pass mark for each station using a recognised approach known as contrasting groups methodology. In addition to achieving a mark greater than the overall pass mark for the examination, candidates must also achieve a pass in each of the four broad content areas. A standard setting group reviews all the marks from the different exam centres to assure scenario and examiner performance before computing pass marks.

Most of the stations have examiners present. All examiners must complete a training of trainer course. The marking scheme is a matrix in which the stations are marked using several domains. There is a structured mark sheet for each station. The mark sheet includes a holistic judgment of the candidate. Candidates must reach the overall pass mark set for Clinical compartment. Examination area should be roomy, spacious, secured and free of external disturbances.

Portfolio Assessment

Individual portfolios must be submitted to the board of examiners at the time of formative and summative assessment.

Content for Portfolio:

(A). Procedural competency documentation
(B). Clinical Case Study with critical review of the literature
(C). Assignment/ Project report of Community Orthopaedics Module
(D). Records of practical procedures undertaken (logbooks/ surgical case log)
(E). Completion certificates of compulsory courses and one optional course
(F). Reflections of orthopaedic CME events
(G). Presentations/ Reports
(H). Recommendation of good ethical and professional attitude

(A) Procedural competency documentation

	Procedures	Cases
	Trauma	
1.	Wound debridement, open fractures	10
2.	External fixator	5
3.	Fasciotomy	2
4.	Shoulder dislocation, MUA	2
5.	Fracture shaft of humerus, plating	1
6.	Supracondylar fracture of humerus, MUA POP	3
7.	Supracondylar fracture of humerus, OR IF	2
8.	Supracondylar fracture of humerus, CR PC pinning	1
9.	Paediatric both bones fracture forearm, MUA POP	3
10.	Both bones fracture forearm, plating	1
11.	Fracture distal end of radius, MUA POP	10
12.	Fixation of hand fractures	5
13.	Hand amputation	2
14.	Flexor tendon repair	2
15.	Extensor tendon repair	2
16.	Nerve repair	2
17.	Hip dislocation, MUA	1
18.	Fracture neck of femur, hip screws	1*
19.	Trochanteric fracture, DHS	1
20.	Fracture shaft of femur, K' nailing	1
21.	Fracture shaft of femur, locking nail	1
22.	Fracture patella, TBW	1
23.	Fracture shaft of tibia, IM Nailing	1
24.	Malleolar fracture, fixation	1
	Orthopaedics	
1.	Skin coverage procedures, SSG	10
2.	Skin coverage procedures, FTSG	2
3.	Skin coverage procedures, V-Y advancement flap	1
4.	Soft tissue release procedure	2
5.	Drainage of hand infections	2
6.	Septic arthritis, arthrotomy	1
7.	Sequestrectomy	1*
8.	Bone graft	1*
9.	Biopsy	2
10.	FNAC	2
11.	Below knee amputation	1
12.	Above knee amputation	1*
13.	Skeletal traction	2
14.	Skull traction	2
15.	POP long leg cast	3
16.	CTEV management, Ponseti method	3
17.	Thoracolumbar spine, pedicle screw fixation	1*
18.	Arthroplasty (Hemi or bipolar)	2

Remarks: (1) All procedures mentioned above must be performed by candidate independently during the course except the cases marked with (*) for which performed under supervision will be accepted.

(2) Procedural competency documentation for each procedure must be checked and recommended by supervisor and satisfied by consultant orthopaedic surgeon.

(B) Clinical Case Study with critical review of the literature

Candidate will be invited to submit a clinical study demonstrating physical examination, diagnosis and treatment relevant to the clinical module. It must maintain the patient's anonymity. The candidate will be required to undertake a critical review of the literature on an allocated topic, presented in written format.

(C) Assignment/ Project report of Community Orthopaedics Module

Candidates will be assigned to the state or region level hospital for two weeks under supervision of senior consultant orthopaedic surgeon for team based assigned project and they must submit their project report.

(D) Records of practical procedures undertaken (logbooks/ surgical case log)

The recommended contents in log book are:

1. Curriculum vitae (personal)
2. Period of course, Institution and degree
3. Operations: Indications, procedure, result, follow-up, remarks.
4. Level of competency in participation
5. Remarks by course supervisor

It has to be assessed according to practice base learning improvement every three months and must be satisfied by head of department.

(E) Completion certificates of compulsory courses and one optional course

Compulsory courses

- ATLS/ PTC
- Basic Surgical Skill Course
- Basic Orthopaedic Skill Course
- AO Principle of fracture fixation Course

Optional courses

- AO Principle of Spine Course
- Basic Arthroplasty Course
- Basic Hand Course
- Basic Paediatric Course
- Basic Arthroscopy Course
- Basic Instructional Course for Microsurgery
- Illizharov Course
- Flap Course

(F) Reflections of orthopaedic CME events

Candidates must submit the reflections of orthopaedic CME events which they attended (minimum three occasions). These will be reviewed by the board of examiners.

(G) Presentations/ Reports

Candidates must submit their presentations/ reports such as case presentations, journal club, institutional conferences, national conferences, clinical audits report including morbidity and mortality clinic, self study (read log), oversea experiences of applicable, professional development series of talk, seminar, workshop.

Weight age

Compartment

1. Written assessment: 3 OITE (50%) + MSQ (50%) - 100 marks (aggregate score)
2. Clinical assessment: OSCE x 15 stations - 100 marks (aggregate score)
3. Portfolio assessment - Satisfactory/ Unsatisfactory
4. Dissertation assessment - 100 marks (aggregate score)

Pass marks

The candidate must pass at least 60 % in all compartments including satisfactory Portfolio assessment.

Credit - 75 marks in all compartments with good accreditation score

The failed candidate for theory and clinical assessment has to face these two compartments in next summative examination (six months interval). The candidate who failed three successive summative assessments will be returned to mother unit (RTU).

The candidate with unsatisfactory in portfolio assessment has to resubmit his/ her portfolio after fulfilling their deficiencies in six months. The candidate who failed will get a last chance to resubmit his/ her portfolio after improvement in six months. The candidate will leave the course if unsatisfactory in last portfolio assessment.

The candidate who failed in dissertation assessment has to resubmit dissertation after fulfilling the requirements suggested by readers six months after summative examination. The candidate who failed will get a last chance to resubmit his/ her dissertation after improvement in six months. The candidate will leave the course if unsatisfactory.

6.3 Dissertation

1. based on research methodology and evidence based practice
2. submitted as one compartment of the summative assessment and to be assessed
3. design of study
   a. biomolecular / biomechanical / bioengineering studies
   b. clinical study
   c. clinical epidemiology which can reflect the changing trends, aetiology, incidence and aids in surveillance system
4. protocol must be approved by postgraduate board of study for orthopaedics before the end of December, Year-1
5. regular supervision of progress
   a. reporting to head of department
   b. three monthly formative assessment
6. Final dissertation must be submitted to the Board of Study of respective University three months before final summative assessment

7. Resources
7.1 Personnel

Trainers

- There must be adequate full time faculty.
- Regular recruitment and training of trainers are important to consider as resources.
- Regular refresher courses are crucial for faculty development.
- A mechanism for utilization of retired experienced teachers should be considered as honorable faculty.
- Honorable research consultant for the faculty is appreciated.

Psychomotor Development

- Optimal support for the standard learning atmosphere e.g. – class room, accessories, facilities, media, skill lab etc. should be developed.
- To promote the teaching learning environment to a desired standard, service development program should be parallel developed.

Resources for Training

- Psychomotor skill lab development
- National Research Institute Training centers
- Funding and training resources from Orthopaedic Industrial partners like J & J, medtronic, Biomet, Smith & prophases etc.
- Asia Pacific, ASEAN, AO foundation Training Centers
- Inter University Collaborative Exchange Program
- Training offer from oversea university hospital and or volunteer professional association or group of volunteers, social foundations

7.2 Training Areas

- University hospitals are major training centers.
- The role of private sector in professional organization as teaching resources centre apart from public teaching hospital should be contemplated.
- International training is mandatory.

7.3 Libraries

- Institute libraries
- Hospital libraries
- Inter library network and inter library loan facilities

Recommended Reference Book for Master Degree in Orthopaedics

Books & CDs

1. Agur AMR & Dalley II AF (eds) (2013). *Grant's Atlas of Anatomy*, 13th ed, Wolters Kluwer, Philadelphia.
2. *AO Manual of Principles in Internal Fixation.*
3. Bartleson JD & Deen HG (2009). *Spine Disorders: Medical and Surgical Management*, Cambridge University Press, Cambridge.
4. Berger RA & Weiss APC (eds) (2004). *Hand surgery*, Lippincott Williams & Wilkins.
5. Browner BD, Jupiter JB, Levine AM &Trafton PG (eds) (2003). *Skeletal Trauma*, Basic Science, Management, and Reconstruction, 3rd ed, Saunders, Philadelphia.
6. Bucholz RW, Heckman JD, Court-Brown CM & Tornetta P (eds) (2010). *Rockwood and Green's Fractures in Adults & Children*, 7th ed, Lippincott Williams & Wilkins.
7. Bullough PG (2010). *Orthopaedic Pathology*, 5th ed, Mosby Elsevier, Missouri.
8. Canale ST & Beaty JH (eds) (2013). *Campbell's Operative Orthopaedics*, 12th ed, Elsevier Mosby, Philadelphia.
9. Chapman MW (2001). *Chapman's Orthopaedic Surgery*, 3rd ed, Lippincott Williams & Wilkins.
10. *Clubfoot - Ponseti Management*, 3rd ed.
11. Ellis H (2006). *Clinical Anatomy, Applied anatomy for students and junior doctors*, 11th ed, Blackwell Publishing, Massachusetts.
12. Flynn ( ). *Operative Technique in Pediatric Orthopaedics*.
13. Grundy D & Swain A (2002). *ABC of Spinal Cord Injuries*, 4th ed, BMJ Books, London.
14. Haid RW, Subach BR & Rodts GE (eds) (2003). *Advances in Spinal Stabilization*, Karger dramroo, Basel.
15. Hamblen DL & Simpson AHRW (eds) (2010). *Adam's Outline of Orthopaedics*, 14th ed, Churchill Livingstone, Edinburgh.
16. Hansen JT (ed) (2010). *Netter's Clinical Anatomy*, 2nd ed, Saunders, Philadelphia.
17. Hefti F (2007). *Pediatric Orthopedics in Practice*, 4th ed, Springer-Verlag, Berlin.
18. Herkowitz HN, Garfin SR, Eismont FJ, Bell GR & Balderston RA (eds) (2011). *Rothman-Simeone: The Spine. Vol I & II*, 6th ed, Saunders, Philadelphia.
19. Herring JA (ed) (2008). *Tachdjian's Pediatric Orthopaedics*, 4th ed, Saunders, Philadelphia.
20. Hoppenfeld S, deBoer P & Buckley R (eds) (2009). *Surgical Exposures in Orthopaedics: The Anatomic Approach*, 4th ed.
21. Jasmin C, Capanna R, Coleman R, Coia LR & Saillant G (eds) (2005). *Textbook of bone metastases*, Wiley, Chichester.
22. Khurana JS (ed) (2009). *Bone Pathology*, 2nd ed, Humana Press, New York.
23. Kirk RM & Ribbans WJ (eds) (2004). *Clinical Surgery in General, RCS Course Manual*, 4th ed, Churchill Livingstone, Edinburgh.
24. Malawer MM & Sugarbaker PH ( ). *Musculoskeletal Cancer Surgery: Treatment of Sarcomas and Allied Diseases*. Washington Cancer Institute.
25. McRae R (2004). *Clinical Orthopaedic Examination*, 5th ed, Churchill Livingstone, Edinburgh.
26. Miller MD, Thompson SR & Hart JA (eds) (2012). *Review of Orthopaedics*, 6th ed, Elsevier Saunders, Philadelphia.

27. Morrissy RT & Weinstein SL (eds) (2006). *Lovell & Winter's Pediatric Orthopaedics*, 6th ed, Lippincott Williams & Wilkins.
28. *Orthopaedic Knowledge Update: Pediatrics* (2006), 3rd ed.
29. Orthopaedic Research Society (2013). *Orthopaedic Basic Science: Foundations of Clinical Practice*, 4th ed, AAOS, Rosemont.
30. OTA (2012). *Instructional Course Lectures: Trauma 2*, AAOS, Rosemont.
31. OTA (2012). *Trauma Guideline & Instructional Guideline*.
32. Owen R ( ). *Scientific Foundation of Orthopaedics & Traumatology*.
33. Ruedi TP & Murphy WM (eds) (2000). *AO Principles of Fracture Management*, Thieme Stuttgart, New York.
34. Schatzker J & Tile M (2005). *The Rationale of Operative Fracture Care*, 3rd ed, Springer, Berlin.
35. Scott WN (ed) (2012). *Insall & Scott Surgery of the Knee*, 5th ed, Elsvier, Philadelphia.
36. Solomon L, Warwick D & Nayagam S (eds) (2010). *Apley's System of Orthopaedics and Fractures*, 9th ed, Hodder Arnold, London.
37. Swanwick T & McKimm J (eds) (2011).*ABC of Clinical Leadership*, Wiley-Blackwell, Oxford.
38. Tanavalee A, Mow CS, Abbas AA, Azores GMS, Budhiparama NC & Lo NN (2013). *Comprehensive Hip & Knee Textbook*, ASEAN Arthroplasty Association, Holistic Publishing, Bangkok.
39. Vigorita VJ ( ). *Orthopaedic pathology*, 2nd ed, Wolters Kluwer, Lippincott Williams & Wilkins.
40. Volgas DA & Harder Y (eds) (2011). *AO Trauma: Manual of Soft-Tissue Management in Orthopaedic Trauma*, Thieme Stuttgart, New York.
41. Wiesel, Sankar, Delahay ( ). *Principle of diagnosis and treatment in orthopaedics*.
42. Willams NS, Bulstrode CJK & O'Connell PR (eds) (2013). *Bailey & Love's Short Practice of Surgery*, 26th ed, CRC Press, London.
43. Wolfe SW, Hotchkiss RN, Pederson WC & Kozin SH (eds) (2011). *Green's Operative Hand Surgery*, 6th ed, Elsevier, Philadelphia.

Journals

1. Journals of Bone & Joint Surgery (American volume)
2. The Bone & Joint Journal (formerly JBJS British volume)
3. Orthopaedic Clinic of North America
4. Orthopaedic Journal of APOA
5. Journal of American Academy of Orthopaedic Surgeons series

Teaching Videos for Surgical Skills

1. AO fracture fixation techniques
2. Spine surgery
3. Arthroplasty
4. Arthroscopic surgery
5. Micro-reconstructive surgery
6. 3 D Anatomy
7. ATLS / BLS Course Manual

8. Degree Conferred

After the completion of three years course, M.Med.Sc (Master of Medical Science) in Orthopaedics degree is conferred.

Governance

1. Board of Study

Board of Study for master degree should be revised with professional authorities and responsible teachers including other allied specialties.

1. Heads of department of Orthopaedics (all Universities of Medicine)
2. Department of Anatomy, Physiology, Pathology,
3. Department of Preventive and Social Medicine,
4. Department of Radiology, Rehabilitation Medicine,
5. Department of Medicine, Surgery, Obstetrics & Gynaecology, Child Health (of respective University of Medicine)
6. Research consultant as granted by the department of Orthopaedics
7. Emeritus Professors, Professors, Associate Professors, Lecturers of Orthopaedics
8. Secretary as granted by head of department

2. Selection of Candidates

2.1 Criteria for Application

1. The applicant must be a citizen of Myanmar.
2. He/She must be holder of M.B., B.S or equivalent degree in Medicine.
3. He/She must be valid registered member of Myanmar Medical Council.
4. He/She must have valid English proficiency.

2.2 Selection Examination

Selection

Selection criteria will be as follows:

- Curriculum Vitae of applicant including CME accreditations & Good academic score (20% weightage)
- In depth referee confidential report (minimal three referees from profession & two from administration) (40% weightage)
- Entrance examination (Theory and Interview) (40% weightage)

The selection board should consist of:

1. Director General, Department of Medical Sciences	Chairman
2. Rectors of University of Medicine	Member
3. Chairman of Postgraduate Board of Study in Orthopaedics, University of Medicine (I), University of Medicine (Mandalay), University of Medicine (II) & University of Medicine (Magway)	Member
4. Director, postgraduate education, Department of Medical Sciences	Secretary

2.3 Number of Candidates Intake

In accordance with national health plan and training facilities (minimum 30 candidates per year)

3. Career Ladder

The candidate who completed the master course including one year post residential training period will be recognized as Consultant Orthopaedic Surgeon.

Conclusion

Education is a lifelong process. Learners are also life long learners. The curriculum should be flexible, changeable and definable with situation needs. It is an art of balancing between teachers and learners with appropriate shaping to teaching strategies without disturbing the objectives.

The learners must know the curriculum; its objectives, contents and education system to which they have to be adapted. The teachers must also know and follow the process of education and responsible for sustained development, generation of new ideas and should oriented to educational research for the development.

When medical and health professions education is entrusted to our hands it is our privilege and honor to uphold this noble profession in producing next generation of leaders. The success in medical education will be judged by the parallel improvement in standard health care for our community as a whole. This will be a significant and long term positive impact on the future orthopaedics.