



**YENEPOYA UNIVERSITY**

**Deralakatte, Mangalore - 575018**

**REGULATIONS AND CURRICULUM GOVERNING  
POSTGRADUATE PROGRAM (MS) IN  
ORTHOPEADICS**

**(CURRICULUM - EFFECTIVE FROM 2010-11)**

**ATTESTED**  


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**NOTIFICATION**

**Sub:** Curriculum/Syllabus for MS(Orthopaedics) and MD in Accident & Emergency Medicine.

**Ref:** Agenda No.9 of the minutes of 6<sup>th</sup> Academic Council meeting held on 07<sup>th</sup> February 2011

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The proposed Curriculum/Syllabus for MS(Orthopaedics) and MD in Accident & Emergency Medicine as approved by the Academic Council and Board of Management at their meetings held on 7<sup>th</sup> & 8<sup>th</sup> February 2011 respectively are hereby notified for implementation.

To:  
The Principal, YMC

Cc to: 1. HOD of Dept. of Orthopaedics, YMC  
2. HOD of Dept. of Emergency Medicine, YMC  
3. Controller of Examinations, YU  
4. Academic Section

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REGISTRAR

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## MS Orthopaedics

### Objectives:

At the end of the course, the candidate should be:

1. Aware of the current concepts in quality care in orthopaedics and musculo-skeletal trauma and also of diagnosis, therapeutic, medical or surgical management of orthopaedic problems,
2. Able to offer initial primary management of acute orthopaedic and trauma emergencies.
3. Aware of the limitations and refer readily to major centers for more qualified care of cases which warrant such referral.
4. Aware of research methodology and be able to conduct research and publish the work done.
5. Able to effectively communicate with patients, their family members, people and professional colleagues.
6. Able to exercise empathy and a caring attitude and maintain high ethical standards.
7. Continue to evince keen interest in continuing education irrespective of whether he/she is in a teaching institution or in clinical practice.

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## Course contents:

Essential theoretical knowledge

### I. BASIC SCIENCES

#### Anatomy:

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

#### Physiology:

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

#### Pathology:

- i. General pathology.
- ii. Tumour pathology in musculo skeletal system.
- iii. Other orthopaedic pathology.

#### Biochemistry:

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

#### Genetics in Orthopaedics

### II. CLINICAL ORTHOPAEDICS

#### General Orthopaedics:

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

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### **III. ORTHOPAEDIC TRAUMATOLOGY**

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

### **IV. DISEASES IN ORTHOPAEDICS**

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

### **V. SPORTS MEDICINE INCLUDING ARTHROSCOPY**

### **VI. ESSENTIAL DIAGNOSTIC SKILLS - INSTRUMENTATION**

#### **Radiology:**

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

#### **Interventional Radiography:**

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

#### **Arthroscopy**

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## **Biopsy**

- a) Trocar
- b) FNAC

## **VII. SURGICAL SKILLS**

Anaesthesia

Regional anaesthesia

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

## **VIII. SURGICAL PROCEDURES**

### **A. Pelvic girdle and lower limb**

- a) Fracture fixation.
- b) Osteotomies and Arthrodesis in lower limb.
- c) HRA in Hip joint.
- d) Soft tissue surgeries.
- e) Foot and ankle surgery.
- f) Management of non union of fractures with illizarov.
- g) Deformity correction with illizarov.
- h) Ligamentous reconstruction of knee joint.
- i) Plastic reconstruction and other reconstructive procedures in musculoskeletal trauma.
- j) Arthroscopic surgeries.
- k) Total hip arthroplasty.
- l) Total knee arthroplasty.
- m) Total ankle arthroplasty.
- n) Stabilisation of pelvic fracture by external fixator.
- o) Acetabular fracture fixation and pelvic osteotomies.

### **B. SHOULDER GIRDLE AND UPPER LIMB**

- a) Fracture fixation, Osteotomies and Arthrodesis in upper limb.
- b) Reconstructive surgeries in shoulder joint.
- c) Soft tissue surgeries.
- d) Elbow and Hand surgery.
- e) Management of non-union of fractures with illizarov.
- f) Deformity correction with illizarov.

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- g) Plastic reconstruction and other reconstructive procedures in musculoskeletal tumours.
  - h) Arthroscopic surgeries.
  - i) Total shoulder arthroplasty.
  - j) Total elbow arthroplasty.

### **C. SPINE SURGERIES**

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

### **D. SURGICAL PROCEDURES – EMERGENCY**

- a) Primary wound debridement and External fixator application.
- b) Emergency amputations.
- c) Primary internal fixation for compound fractures.

### **IX. RESEARCH AND PRACTICE**

- a) Evidence based medicine.
- b) Level of evidence.
- c) Research methodology
- d) Introduction to bioethics.

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

##### **All 3 years:**

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

- a) Triage.
- b) Resuscitation of polytrauma patients
- c) Splinting of fractures.
- d) Stabilization of spine (splinting).

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

#### **I YEAR**

##### **Trauma care**

- Closed reductions of fractures, Plaster application.
- Debridement of open fractures, External fixations.

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Internal fixations of minor fractures with K wire.

**Non-traumatic conditions**

Manipulative correction of congenital problems like CTEV

Biopsies

Excision of benign lesions.

Tendon lengthening.

**II year**

**Trauma**

Tension band wiring of fracture patella, fracture olecranon, etc

DCP of forearm bones, tibia, etc.

DHS

**Non- traumatic conditions:**

Carpal tunnel release

Bone grafting

Soft tissue release under supervision

**III Year**

**Trauma**

Hemi replacement arthroplasty of femur.

Dynamic condylar screw fixation

Interlocking nailing of long bone fractures

**Non- traumatic conditions**

Osteotomies

Soft tissue release

Tendon transfers

Basic arthroscopy (diagnostic)

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



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## Teaching learning Activities

### Participation in departmental activities

1. Clinical rounds – bedside clinical discussion, treatment modalities, record maintenance, discussion of alternate methods of management, PG notes, etc.
2. Journal review meeting.  
Review of recent journals and presentation of the same in the departmental meetings. Should include indexed international and national journals. At least four presentations should be made by each candidate in each year of the course.
3. Seminars – on Musculoskeletal trauma and diseases in orthopaedics. Arthroplasty, spinal instrumentation and recent advances in orthopaedics. At least 4 seminars per year by each MS candidate.
4. Should attend CPCs.
5. Interdepartmental meetings – Ortho – radiology and Ortho-pathology meetings should be attended by PGs.
6. Preparation and presentation work – should present to the department the review of literature in the first year and whole work by the second year to the department.
7. Case presentations.

## ROTATION AND POSTING IN THE OTHER DEPARTMENTS

### Basic Sciences

Anatomy – one hour every week in anatomy dissection hall for 6 months in the first year.

### Applied subjects - posting in second year.

Casualty / emergency medicine for 2 weeks.

Anaesthesia for 2 weeks.

Radiology including CT/MRI for one month.

Neurosurgery for one month.

Plastic surgery for one month.

Surgical ICU/general surgical unit for one month.

### Allied subjects

Posting in artificial limb centre / physical medicine and rehabilitation for one month. Training in teaching skills

Bedside clinic for undergraduates for 20 hours.

Bedside clinic for first year PG by third year PG for 10 hours.

Should have attended at least one National CME during the course.

Should have presented at least one paper in any of the Orthopaedic Conferences during the course.

## Dissertation:

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Every candidate pursuing MS degree course is required to carry out work on a selected research project under the guidance of a recognized postgraduate teacher. The results of such a work shall be submitted in the form of a dissertation.

The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem formulation of a hypothesis, search and review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, and comparison of results and drawing conclusions.

Every candidate shall submit to the Registrar (Academic) of the University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within six months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.

Such synopsis will be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.

The dissertation should be written under the following headings:

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

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

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

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

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Change of guide: In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the university.

For some more details regarding Guide etc., please see chapter I and for books on research methodology, ethics, etc., see Chapter IV.

1. Methods – Theory examinations.  
Clinical examinations
2. Frequency – Theory exams once in 6 months.  
Clinical examinations once in a year.
3. Log book records.

### **Orientation Programmes**

- a. Use of library – use of periodicals, use of electronic library, use of internet.
- b. Laboratory procedures – FNAC, bone marrow aspiration.
- c. National programmes – attending postgraduate teaching programs advised.
- d. Regulations – medical ethics.
- e. Research Methodology.

### **Monitoring Learning Progress:**

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

The learning out comes to be assessed should include:

- (i) Personal Attitudes.
- (ii) Acquisition of Knowledge.
- (iii) Clinical and operative skills.
- (iv) Teaching skills
- (v) Dissertation

**(i) Personal Attitudes:** The essential items are:

- Caring attitudes.
- Initiative.
- Organisational ability.
- Potential to cope with stressful situations and undertake responsibility.
- Trust worthiness and reliability.
- To understand and communicate intelligibly with patients and others.

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

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

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

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

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

**Clinico- Pathological Conferences:**

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

**Surgical Audit:**

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

(iii) **Clinical Operative skills:**

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

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

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

**(iv) Teaching skills:**

Candidates should be encouraged to teach undergraduate medical students and paramedical students if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students (Sec Model checklist V. Chapter IV)

**(v) Dissertation in the Department:**

Periodic presentations are to be made in the department. Initially the topic selected is to be presented before submission to the University for Registration, again before finalisation for critical evaluation and another before final submission of the completed work (See Model Checklist VI & VII, Chapter IV).

**(vi) Periodic tests:**

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

**(vii) Work diary / Log Book :**

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

**(viii) Record:**

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

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**LOG BOOK:**

The log book is a record of the important activities of the candidates during his training. Internal assessment should be based on the evaluation of the log book. Collectively, log books are a tool for the evaluation of the training programme of the institution by external agencies. The record includes academic activities as well as the presentations and procedures carried out by the candidate.

**Format for the log book:**

For the different activities is given in Tables 1, 2 and 3 of Chapter IV. Copies may be made and used by the institutions.

**Procedure for defaulters:**

Every department should have a committee to review such situations. The defaulting candidate is counselled by the guide and head of the department. In extreme cases of default the departmental committee may recommend that defaulting candidate be withheld from appearing the examination, if she/he fails to fulfil the requirements in spite of being given adequate chances to set himself or herself right.

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## Scheme of Examination

### A. Theory:

There shall be four question papers, each of three hours duration. Each paper shall consist of two long essay questions each question carrying 20 marks and 6 short essay questions each carrying 10 marks. Total marks for each paper will be 100. Questions on recent advances may be asked in any or all the papers. Details of distribution of topics for each paper will be as follows:

Paper I - Basic and clinical sciences as applied to Orthopaedics

Paper II - Musculo-skeletal Trauma.

Paper III - General Orthopaedics, Joint Disorders and Spine.

Paper IV - Regional Orthopaedics

### B. Clinical: 200 Marks

There shall be one long case and three short cases to be examined and presented by each candidate. Marks shall be 200.

### C. Viva Voce : 100 Marks

#### 1) Viva- voce Examination : (80 Marks)

All examiners will conduct viva-voce conjointly on candidate's comprehension, analytical approach, expression and interpretation of data. It includes all components of course contents. In addition candidates may be also be given case reports, charts, gross specimens, pathology slides, instruments, X-rays, ultrasound, CT scan images, etc., interpretation. It includes discussion on dissertation also.

#### 2) Pedagogy Exercise: (20 Marks)

A topic is given to each candidate in the beginning of clinical examination. He/she is asked to make a presentation on the topic for 8-10 minutes.

### D.

Maximum marks for M.S. in Orthopaedics	Theory	Practical	Viva	Grand Total
	400	200	100	700

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### **Recommended books and Journals:**

1. Campbell's Operative Orthopaedics 8<sup>th</sup> edition, S. Terry Canale, editorial assistance by Kay Daughtery published by MOSBY, St. Louis, USA, 1998, 400 UK \$
2. Fractures in adults and Children 4<sup>th</sup> edition Charles A. Rockwood Jr., David P. Green, Robert E. Bucholz, and James D Heckman, 1996, Lippincott – Raven Publishers, USA.
3. Orthopaedic, 5<sup>th</sup> edition, edited by Samuel Turek, published by Jaypee Brothers New Delhi, 1993.
4. Mercer's Orthopaedic Surgery 9<sup>th</sup> edition Robert B Duthie and George Bentley, published in Great Britain in 1996 by Arnold.
5. J.N. Wilson Watson – Jones Fracture and Joint injuries 6<sup>th</sup> edition, published by B.I. Churchill. Livingstone Pvt. Ltd. New Delhi – 1992, price: Rs. 1400-00.
6. Knee Surgery edited by Paul M. Aichroth and W. Dilworth Cannon, Jr. Published in USA by Raven Press in 1992, \$3127.
7. Total Hip Joint Replacement edited by Eftekhar NS.
8. Total Knee Arthroplasty, edited by James A. Rand, published by Raven press; New York 1993.
9. Turek's text book of orthopaedics.
10. Rockwood and Green – text book of fractures and joint injuries.
11. Browner – Fractures and dislocations.
12. Gustilo – Fractures and joint injuries.
13. Sharrard – Paediatric orthopaedics.
14. Tachdain – Paediatric orthopaedics.
15. Enneking – Bone tumours.
16. Campanacci – Bone tumours.

### **Journals**

1. Journal of Bone and Joint Surgery America
2. The Bone and Joint Journal British.
3. American Journal of Orthopaedics.
4. Clinical Orthopaedics and Related Research.
5. Orthopaedic Clinics of North America.
6. Trauma.
7. Arthroscopy.
8. Indian Journal of Orthopaedics.
9. Journal of Arthroplasty.
10. Journal of Spine Surgery.
11. Acta Orthopaedica Scandinavia.
12. Journal of paediatric Orthopaedics