



SHRI  
DHARMASTHALA  
MANJUNATHESHWARA  
UNIVERSITY

Ordinance Governing  
**MS Orthopaedics**  
Curriculum 2019-20

**SHRI DHARMASTHALA MANJUNATHESHWARA UNIVERSITY**

(A State Private University established under the Shri Dharmasthala Manjunatheshwara University Act No 19 of 2018 of Government of Karnataka and Notification No. ED 261 URC 2018 dated 19th December 2018)

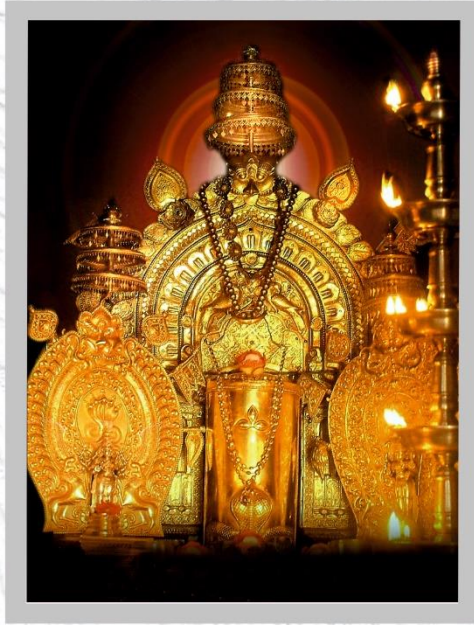
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|| Om Shri Manjunathaya Namaha ||



Shree Kshethra Dharmasthala

**Edition Year : 2019-20**

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## THE LOGO

Poojya Dr D. Veerendra Heggade, Hon'ble Chancellor of the University, while searching for an appropriate Logo for the University, saw a photograph picked from Temple Architecture showing Wings of a Bird, sculpted in Indian style and wanted it to be incorporated in the logo for the University, as the Wings symbolize 'Spreading of Knowledge beyond Boundaries'. Further it was felt that the Central theme of the logo should be 'Rudra' (The Linga) with three wings on each side. In this way, the logo of the University was conceptualized.

Hence:

1. The central part represents **Rudra** who Demolishes Darkness.
2. The Three **horizontal lines on The Linga** stand for Samyak Darshan (Right Belief), Samyak Gyan (Right Knowledge) and Samyak Charitra (Right Conduct).
3. The **Wings** symbolize spreading of Knowledge across the boundaries.
4. Base line "**Truth Liberates**" highlights the Purpose of Education: to liberate oneself unconditionally. It shows that it is not discipline, nor knowledge nor the efforts to freedom that liberate but Truth is what liberates you from all your conditioning and ignorance.

The overall significance of Shri Dharmasthala Manjunatheshwara University's Logo is:

**Darkness of ignorance is destroyed by the flow of knowledge to bring Liberty to everyone, by realizing the truth. And, it should spread globally without the boundaries as hindrance.**



SHRI  
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## VISION

Shri Dharmasthala Manjunatheshwara University will set the highest standards of teaching and learning by awakening the intelligence of the students and nurturing the creativity hidden in them by creating an environment where the ancient wisdom blends with modern science, to transform them into whole human beings to face the challenges.

## MISSION

- ▶ To ensure that the journey of education is inspiring, pleasant and enjoyable.
- ▶ Attract the best of teachers and students.
- ▶ Achieve high principles of trust, love and spirituality in the students.
- ▶ Create a collaborative, diverse and exclusive community.
- ▶ Transform the student of today to be a leader of tomorrow and a better human being.
- ▶ Produce passionate teachers.
- ▶ Evolve innovative teaching techniques.
- ▶ Create a peaceful environment.
- ▶ Prepare the student to face the social challenges.
- ▶ Create a University of which the Nation is proud of.
- ▶ Be an effective partner in Nation Building.
- ▶ Create an Eco-friendly University.
- ▶ Create a University based on the principles of beauty, love and justice.

||Om Shanti! Om Shanti! Om Shanti||



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SDMU/Notif/28/2019

Date: 24 - 04 - 2019

## NOTIFICATION

### Regulations and Curricula of Medical Postgraduate Degree Courses in Clinical Subjects - 2019

- Ref:**
1. Minutes of the Board of Studies - Medical PG held on 16-03-2019 (SDMU/BOS PG: 01/2019 dated 16-03-2019)
  2. Minutes of the 1st Joint Faculty Meeting held on 19-03-2019 (Letter No: SDMU/JF/M-01/85/2019; Dated: 19-03-2019)
  3. Minutes of the 1st Meeting of Academic Council held on 20-03-2019 (Letter No: SDMU/AC/M-01/93/2019; Dated: 21-03-2019)
  4. Minutes of the 2nd Meeting of BoM held on 22-03-2019 (Letter No: SDMU/BoM/M-02/94/2019; Dated: 23-03-2019)

**Ordinance:** In exercise of the powers conferred under Statutes 1.1 (Powers - Section xii), 1.2 (Powers and Functions - Section vii), 1.4 (Powers and Functions - Sections ix & x), 1.5b (Powers and Functions - Sections b & c) of Shri Dharmasthala Manjunatheshwara University, the BoM is pleased to approve and notify the Ordinance governing Regulations and Curricula of the following Medical Postgraduate Degree/ Diploma Courses in Clinical Subjects - 2019:

Sl No	Course	Sl No	Course
1	M.D. (General Medicine)	7	M. D. (Hospital Administration)
2	M. D. (Pediatrics)	8	M. S. (General Surgery)
3	M. D. (Dermatology)	9	M. S. (Ophthalmology)
4	M. D. (Psychiatry)	10	M. S. (Orthopedics)
5	M. D. (Anaesthesiology)	11	M. S. (Otorhinolaryngology)
6	M. D. (Radio-Diagnosis)	12	M. S. (Obstetrics & Gynecology)

#### Diploma

- 1 Diploma in Public Health

The ordinance shall be effective for the students joining the courses during 2019-20 and onwards.

By Order  
  
REGISTRAR

- To:**
1. The Principal, SDM College of Medical Sciences & Hospital.
  2. Members of BoG, BoM & Academic Council, Shri Dharmasthala Manjunatheshwara University

- Copy to:**
1. The Vice-Chancellor, Shri Dharmasthala Manjunatheshwara University
  2. The Controller of Examinations, Shri Dharmasthala Manjunatheshwara University

## CHAPTER I

### Goals & Objectives

The purpose of this programme is to standardize postgraduate orthopaedic teaching on par with other Universities in our country, to achieve uniformity in postgraduate teaching. It will also result in creating competent orthopaedic surgeons with appropriate expertise.

### Objectives:

At the end of the course, the candidate should be able to achieve the following skills and competencies:

1. Ability to offer initial primary management of acute orthopaedic and traumatic emergencies.
2. Awareness of the current concepts of scientifically acceptable quality care in terms of diagnosis, medical and surgical management of orthopaedic problems and musculoskeletal trauma.
3. Awareness of research methodology and be able to conduct research and publish the work done.
4. Ability to exercise empathy and a caring attitude and maintain high ethical standards.
5. Demonstrate a keen interest in continuing education irrespective of whether he/she is in a teaching institution or in clinical practice.
6. Acquire skills to manage orthopaedic services.
7. Organize rehabilitative services to the physically handicapped persons

8. Patient-Doctor Relation: Develop the ability to communicate with the patient and the relatives pertaining to the disease, available treatment options, risks and benefits of the treatment and prognosis.
9. Preventive aspects: Acquire knowledge and pursue the prevention of orthopaedic disorders. Prevention of development and progression of deformities and the complications thereof following poliomyelitis, cerebral palsy, congenital defects, etc.
10. Follow guidelines: Should follow hygiene and cleanliness to decrease infection, use proper hospital waste management guidelines, judicious use of available drugs, careful handling of instruments (surgical instruments, arthroscope, microscope, image intensifier, etc.).
11. Teamwork: Team spirit should be developed both as a member or leader of the team to work and share responsibility with both medical personnel and paramedics (nurses and other staff).
12. Identify his/her special interest within the subject: Identify the special area(s) of interest e.g. arthroplasty, arthroscopy, hand surgery, oncology, spine, sports medicine, pediatric orthopaedics etc.
13. Education of patient and relatives about common conditions like OA, RA, Rickets, Osteoporosis.
14. Ability to accept his/her limitations and refer readily to higher centre for more qualified care of cases which warrant such referral.

### **Duration of Study**

The period of training for obtaining the degree shall be three completed years including the period of examination.

Provided that in the case of students having a MCI/NMC recognised two year postgraduate diploma course in the same subject, the period of training, including the period of examination, shall be two years.



## CHAPTER II

### Course Review

Training: At the end of the 1st year students should be able to do

1. Elicit a clinical history from a patient, do a physical examination, document in a case record, order appropriate investigations and make a clinical diagnosis.
2. Impart wound care wherever applicable.
3. Apply all types of POP casts/slabs, splints and tractions as per need.
4. Identify shock and provide resuscitation.
5. Triage a disaster situation and multiple trauma patients in an emergency room.
6. Perform under guidance - aspiration of joints and local infiltration of appropriate drugs.
7. Perform under guidance - appropriate wound debridement.
8. Perform under guidance - arthrotomy of the knee joint.
9. Perform under guidance - incision and drainage of an abscess.
10. Perform under guidance - fasciotomies.
11. Apply skeletal tractions including skull tongs under guidance.
12. Apply external fixators under guidance.
13. Perform under guidance closed reduction of common dislocations like shoulder and common fractures like Colles' fracture, supracondylar fracture etc.
14. Perform under guidance, on a cadaver, standard surgical approaches to the musculoskeletal system.

During the first year, the residents shall be posted mainly in orthopaedic wards and in Casualty/emergency ward. Under the supervision of their senior colleagues, they will be responsible for the care of the patients in the ward.

**Students shall be trained regarding:**

1. Usage of digital library and literature search.
2. Dissertation work, synopsis writing and biostatistics.
3. Preparation for the seminar, power-point presentation.
4. Common classes shall be conducted by other departments orienting the students on various practical aspects of clinical work from the perspective of other departments.
5. During the first year, the students will start with the thesis work after submission of the plan.
6. Students will be posted to Anatomy dissection under the supervision of staff to learn surgical anatomy and also common surgical approaches.
7. Students will be trained at skill lab on application of external fixator and various methods of internal fixation.

**At the end of the second year, the student should be able to:**

1. Provide pre and post-operative care.
2. Take an informed consent for standard orthopaedic procedures.
3. Perform under guidance SSG.
4. Perform under guidance diagnostic arthroscopy on models. Assist diagnostic arthroscopy on patients.
5. Perform under guidance application of Ilizarov ring fixator.
6. Perform under guidance on bone models, internal fixation with k-wires, screws, plates, dynamic hip/condylar screws/nailing.
7. Perform under guidance arthrotomy of joints like hip, shoulder, ankle and elbow.
8. Assist closed/open biopsies for lesions of bone, joints and soft tissues.
9. Assist in performing local flaps.
10. Assist sequestrectomy and saucerisation.

11. Assist repair of open hand injuries including tendon repair.
12. Assist arthrodesis of small joints.
13. Assist carpal tunnel/tarsal tunnel release.
14. Assist soft tissue releases in contractures, tendon lengthening and correction of deformities.
15. Assist amputations at different levels.
16. Assist corrective surgeries for CTEV, DDH, Perthes disease or other skeletal dysplasia.

### **Rotation and posting in other departments during the second year:**

The residents will be rotated for two weeks in each speciality namely Intensive Care Unit/ Anesthesia, Plastic & Vascular Surgery, Radiology, Neurosurgery, General Surgery to obtain the core experience during the second year. For one month residents will have their Posting in Artificial Limb Centre / Physical Medicine and Rehabilitation.

The residents should be able to describe and learn/experience the following:

#### **1. ICU & Anaesthesia.**

- Identify and rectify electrolyte disturbance and acid-base imbalance.
- Cardiopulmonary resuscitation and endotracheal intubation.
- Acute and Chronic Respiratory insufficiency interpretation of blood gas analysis.
- Management of ARDS.
- CVP catheter monitoring.
- Management of pulmonary embolism.

#### **2. General Surgery.**

- Triage and establishment of treatment priorities in polytrauma patient.
- Identification of chest wall /lung injuries and chest tube insertion
- Four quadrants abdominal tap for haemoperitoneum
- Describe the potential complications of major intra-abdominal injuries and indication for emergency laparotomy.

- Assessment and management of head injuries and differential diagnosis of altered level of consciousness.
- Management of deep vein thrombosis.

### **3. Plastic / Vascular Surgery.**

- Split skin grafting.
- Fasciocutaneous flaps.
- Muscle pedicle and myocutaneous flaps.
- Management of supernumerary digits and syndactyly.
- Identification of peripheral vascular injury in limb injuries and know the indications for arterial reconstruction.
- Hand, tendon and nerve injuries.

### **4. Neurosurgery**

- To study the management of patients with head injuries and spine injuries in detail.
- To assist neurosurgical operations related to head and spine injuries and other common neurosurgical disorders.
- Various aspects in conservatively managed head injury patients- mobilization, bladder care, nutrition, back care etc.

### **5. Radiology:**

Understanding of the basics of diagnostic imaging in orthopaedics like:

- Plain X-ray
- Ultrasonography and USG guided biopsies
- Computerised Axial Tomography and CT guided biopsies
- Magnetic Resonance Imaging
- PET Scan

- Radio Isotope Bone Scan
- Digital Subtraction Angiography (DSA)
- Dual-energy X-ray Absorptiometry
- Arthrography

At the end of the 3rd year, the student should be able to:

1. Independently perform closed/open reduction and internal fixation with DCP, LCP, intramedullary nailing, LRS.
2. Assist in the surgical management of polytrauma patient.
3. Assist in Arthroplasty surgeries of the hip, knee, shoulder and the ankle.
4. Assist in spinal decompression and stabilization procedures.
5. Assist in operative arthroscopy of various joints.
6. Assist /perform arthrodesis of major joints like hip, knee, shoulder, elbow.
7. Assist in corrective osteotomies around the hip, pelvis, knee, elbow, finger and toes.
8. Assist in surgical operations on benign and malignant musculoskeletal tumours.
9. Assist in open reduction and internal fixations of complex fractures of the acetabulum, pelvis, floating knee/elbow injuries, shoulder girdle and hand.
10. Assist in spinal deformity corrections.
11. Assist in limb lengthening procedures.
12. Assist in revision surgeries.

**During the 2nd year and 3rd year, the student is also expected to:**

1. Attend OPD, operation theatre, ward rounds, emergency duties, speciality clinics as per departmental schedule.
2. Attend and present seminars, journal club, case conference / difficult case, death and complication meet, surgical – pathological – radiological conference regularly as allotted.

3. Get actively involved in the diagnosis and treatment of patients in the ward and emergency.
4. Assist or perform under supervision surgical work, wherever necessary.
5. Attend/ participate / present scientific paper in national/zonal/state conferences
6. To actively participate/help in the organization of departmental courses and workshops.
7. Maintain logbook properly and get it verified from time to time every month.
8. Submit thesis progress report quarterly and complete thesis work in time.
9. Discuss problematic cases with the staff in OPD/ward.
10. Care of in-patients.
11. Visits by rotation the rural clinic for community exposures/work experience
12. Attend 24-hour emergency duty as per the rosters.
13. Attend lectures by the visiting faculty to the department/ college.
14. Students should participate in the teaching and training programme for undergraduate students and interns.
15. Students should participate in disability assessment and preparation of the disability certificate in medical-legal cases.
16. Students should present at least one poster, read one paper at a national/state conference and to present one research paper, which should be published/accepted for publication/sent for publication during the period of his postgraduate studies, so as to make him eligible to appear at the postgraduate degree examination.

### **Methods of Teaching:**

Participation in departmental activities:

1. Clinical rounds – bedside clinical discussion, treatment modalities, record maintenance, discussion of alternate methods of management, PG notes, etc.
2. Seminars – on musculoskeletal trauma and diseases in orthopaedics, arthroplasty, spinal instrumentation and recent advances in orthopaedics. Each student is expected to present atleast four seminars in a year.

3. Case Presentation – A single weekly departmental case presentation and bedside case-presentation during ward rounds. Each student is expected to present atleast four clinical cases in the departmental case presentation and atleast one bedside clinical case every month before the concerned unit.
4. Journal review meeting - Review of recent journals from indexed international and national journals. Student is trained to analyse various research methodologies used by other authors and examine the limitations of such studies. Students are also encouraged to present articles that focus on emerging treatment methods. Each student is expected to present atleast four journal reviews in a year.
5. Should attend clinico-pathological correlation (CPC) meetings.
6. Must attend & participate in Interdepartmental meetings – Ortho-radiology and Ortho-pathology meetings.
7. Preparation and presentation of dissertation work – Student should present the synopsis of the dissertation and review of literature in the first year and complete his full study by the beginning of final year.
8. Presentation of completed thesis in the department before final submission.
9. Attend Mortality meeting.
10. Attend Webinars.

### **Course contents:**

Essential theoretical knowledge

#### **I. BASIC SCIENCES**

##### **A. Anatomy**

- i. Musculoskeletal anatomy – Anatomy of the shoulder girdle, pelvic girdle, upper & lower limbs anatomy of the spine.
- ii. Embryology and development of the musculoskeletal system.
- iii. Histology.

##### **B. Physiology**

- i. Physiology of musculoskeletal system.

- ii. Metabolism of bone, hormonal influence on musculoskeletal system & other related orthopaedic physiology.

### **C. Pathology**

- i. General Pathology.
- ii. Tumour Pathology of the musculoskeletal system.
- iii. Other orthopaedic pathology.

### **D. Biochemistry**

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

### **E. Implants, Orthopaedics implant metallurgy, Biomaterials.**

### **F. Orthotics & Prosthetics.**

### **G. Bone bank, Blood bank & transfusion.**

### **H. Biostatistics & Research Methodology / Non linear mathematics and its application in medicine**

## **II. CLINICAL ORTHOPAEDICS/GENERAL ORTHOPAEDICS:**

- i. General principles of healing of injury & musculoskeletal trauma.
- ii. Systemic management of the injured & body response to trauma.
- iii. Head injury & facio maxillary injury.
- iv. General principles of management of Neurovascular injury.
- v. Management of polytrauma.
- vi. Consequences of musculoskeletal trauma & rehabilitation of the injured.
- vii. General principles of management musculoskeletal trauma- surgical and conservative.
- viii. Open injuries – management and stabilisation procedures in orthopaedics.
- ix. General principles of management musculoskeletal trauma – in children.
- x. Disaster management.

## **III. ORTHOPAEDIC TRAUMATOLOGY**

- i. Musculoskeletal trauma in the shoulder girdle and upper limb.
- ii. Musculoskeletal trauma in the 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 & hormonal disorders in musculoskeletal system.
- iii. Epiphyseal and neuromuscular affections in children.
- iv. Infective Diseases in the musculoskeletal system including polio & Leprosy.
- v. Arthritis and Rheumatic disease.
- vi. Tumours of the 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 & Bone scan.
- e. Stress radiography.
- f. Ultrasonography.

### **Interventional Radiography**

- a. Sinogram.
- b. Myelography.
- c. Epidurogram.
- d. CT Guided biopsy.

- e. Arthrogram.
- f. USG guided biopsy

### **Arthroscopy assisted Biopsy**

#### **Bone biopsy**

- a. Tru-cut biopsy
- b. FNAC.

## **VII. ANESTHESIA SKILLS**

### Regional anaesthesia

- a. Wrist block & Digital block.
- b. Femoral block.
- c. Ankle block.
- d. Brachial block & inter scalene block / Axillary block.
- e. Spinal anaesthesia.
- f. IVRA.

## **VIII. SURGICAL PROCEDURES**

### Pelvic girdle & lower limb

- a. Fracture fixation.
- b. Osteotomies and Arthrodesis in the lower limb.
- c. HRA in Hip joint.
- d. Soft tissue surgeries.
- e. Foot and ankle surgery.
- f. Management of nonunion of fractures with Ilizarov.
- g. Deformity correction with Ilizarov.

- h. Ligamentous reconstruction of the 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.

## **IX. SHOULDER GIRDLE & UPPER LIMB**

- a. Fracture fixation, Osteotomies and Arthrodesis in the upper limb.
- b. Reconstructive surgeries in the shoulder joint.
- c. Soft tissue surgeries.
- d. Elbow and Hand surgery.
- e. Management of nonunion of fractures with Ilizarov.
- f. Deformity correction with Ilizarov.
- g. Plastic reconstruction and other reconstructive procedures in musculoskeletal tumours.
- h. Arthroscopic surgeries.
- i. Total shoulder arthroplasty.
- j. Total Elbow arthroplasty.

## **X. SPINE SURGERIES**

- a. Posterior spinal fusion.
- b. Disc surgery & decompression procedures in spine.
- c. Instrumentation in the spine.
- d. Endoscopic surgery in the spine.
- e. Deformity correction in the spine.
- f. Surgical procedures in TB Spine.

## **XI. EMERGENCY SURGICAL PROCEDURES**

- a. Primary wound debridement & External fixator application.
- b. Emergency amputations.
- c. Primary internal fixation for open fractures.

## **2.1 Graded responsibility in the care of patients and operative work**

### **I YEAR**

- Documentation of injured patients with respect demography MOI, TOI, POI and treatment history.
- Trauma care:
  - Closed reductions of fractures, Plaster application
  - Debridement of open fractures, External fixations
  - 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**

- Documentation of operative work and hospital records.
- Trauma:
  - Tension band wiring of fracture patella, fracture olecranon, etc.
  - DCP of forearm bones, tibia, etc.
  - Fixation of proximal femur fractures.
- Non-traumatic conditions:
  - Carpal tunnel release
  - Bone grafting
  - Soft tissue release under supervision

### **III YEAR**

- Documentation of surgical planning
- Trauma:
  - Hemi replacement arthroplasty of the femur

- Interlocking nailing of long bone fractures
- Non-traumatic conditions:
  - Osteotomies
  - Soft tissue release
  - Tendon transfers
  - Basic arthroscopy (diagnostic)

### **Dissertation & Orientation Programmes**

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

The dissertation is aimed to train a postgraduate 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, 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 or Objectives of the study

- iii. Review of Literature
- iv. Material and Methods
- v. Results
- vi. Discussion
- vii. Conclusion
- viii. Summary
- ix. References
- x. Tables
- xi. Annexures

The written text of the dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other annexures. It should be neatly typed in double line spacing on one side of the paper (A4 size, 8.27" x 11.69") and bound properly. Select font, type, Times New Roman and size of 10 to 12 characters. The size of the title should be 14 and bold, the sizes of the subtitle should be 12 and bold. 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 the 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.

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

### **Orientation programmes**

- a. Use of library – use of periodicals, use of electronic library and 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 the participation of students in various teaching/learning activities. It may be structured and assessment is done using checklists that assess various aspects. Checklists are given in annexures.

The learning outcomes to be assessed should include (1) Acquisition of Knowledge (2) Clinical and operative skills (3) Teaching skills (4) Research

1. 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 presentations made are to be recorded. The logbook should periodically be validated by the supervisors. Some of the activities are listed. The list is not complete.

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

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

Case Presentation: Shall be done weekly and during ward rounds.

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 checklist similar to that used for seminar.

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

## 2. Clinical Operative skills

Day to Day work: Skills in outpatient and ward work should be assessed periodically. The assessment shall include the candidates' sincerity and punctuality, analytical ability and communication skills (see annexure).

Clinical meetings: Candidates shall periodically present cases to his peers and faculty members. This shall be assessed using a checklist (see annexure).

Clinical and Operative skills: The candidate shall 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 logbook. (See Annexure).

3. Teaching skills: Candidates shall be encouraged to teach undergraduate medical students and paramedical students, if any. This performance shall be based on the assessment by the faculty members of the department and from feedback from the undergraduate students (Annexure)

4. Research: Periodic presentations of the dissertation and the progress of the study are to be made in the department. Initially, the topic selected is to be presented before submission to the University for registration, thereafter before finalization for critical evaluation and finally before final submission of the completed work (see Annexure).

The above learning outcomes will be monitored and documented by (1) Periodic tests  
(2) Work diary / Log Book (3) Records

1. Periodic tests: The department may conduct three tests, two of them be annual tests, one at the end of the 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.



2. 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.
3. Records: Records, logbooks and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI.

### **Logbook**

The logbook is a record of the important activities of the candidates during his training. Internal assessment should be based on the evaluation of the logbook. Collectively, logbooks 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 logbook for the different activities is given in Annexure.

Procedure for defaulters: The department will 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 fulfill the requirements in spite of being given adequate chances to set himself or herself right.

### **Scheme of examination**

#### **A. Theory**

There shall be four question papers, each of three hours duration. Each paper shall consist of 10 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 the distribution of topics for each paper will be as follows:

Paper I	Basic and clinical sciences as applied to Orthopedics
Paper-II	Musculoskeletal Trauma

Paper III        General Orthopedics, Joint Disorders and Spine  
Paper IV        Regional Orthopedics.

**B.      Clinical    :      200 Marks**

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

**C.      Viva Voce and Pedagogy    :      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 also be given case reports, charts, gross specimens, pathology slides, instruments, X- rays, ultrasound, CT scan images, etc., for interpretation. It includes discussion on the dissertation also.

**2.      Pedagogy Exercise: (20 Marks)**

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

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

**Recommended books and Journals**

1. Apley's System of Orthopaedics and Fractures
2. Watson-Jones Fractures and Joint Injuries
3. Rockwood and Green's Fractures in Adults
4. Campbell's Operative Orthopaedics – Terry S Canae
5. Tuberculosis of the Skeletal System – SM Tuli
6. Tachdjian's Pediatric Orthopaedics
7. Mercer's Orthopaedic Surgery.

8. Rockwood and Wilkins' Fractures in Children
9. Operative techniques in Orthopaedic Surgery – Sam Wiesel
10. Surgical Exposures in Orthopaedics: The Anatomic Approach - Stanley Hoppenfeld
11. Skeletal trauma: Basic science, Management and Reconstruction – Bruce D Browner
12. Green's Skeletal Trauma in Children
13. Textbook of Ilizarov Surgical Techniques: Bone Correction and Lengthening
14. Clinical Orthopaedic Examination - Ronald McRae
15. Chapman's Orthopaedic Surgery - Michael W Chapman
16. The Closed Treatment of Common Fractures - John Charnley
17. Turek's Orthopaedic Principles and their applications
18. Textbook of Orthopaedics and Trauma – GS Kulkarni
19. Joint Replacement Arthroplasty - Bernard F Morrey
20. Manual of Rheumatology - Prakash K Pispati
21. Interlocking Nailing – DD Tanna
22. Orthopaedic Physical Assessment - David J Magee
23. Fractures of the Pelvis and Acetabulum – Marvin Tile
24. Textbook of Arthroscopy - Mark D Miller
25. Sports injuries - Michael A Hutson
26. Functional fracture bracing: Tibia, Humerus, and Ulna - Augusto Sarmiento
27. Injection Techniques in Orthopaedic and Sports Medicine - Stephanie Saunders
28. Principles of Deformity Correction - Dror Paley
29. Insall and Scott Surgery of the Knee - Norman Scott
30. Current Concepts in Diagnosis and Treatment of Bone and Soft Tissue Tumours – HK Uthoff
31. Macnab's Backache
32. AO Principles of Fracture Management
33. AO Manual of Fracture Management: Internal Fixators: Concepts and Cases using LCP and LISS
34. Intervertebral Disk Diseases: Causes, Diagnosis, Treatment and Prophylaxis - Juergen Kraemer
35. Clinical Surgery - S. Das
36. The Orthopaedic Physical Examination - Bruce Reider
37. Kinesiology of the Musculoskeletal System –Donald A. Neuman.
38. Gray's Anatomy - The Anatomical Basis of Clinical Practice – Susan Standring.

## **Journals**

1. Journal of Bone and Joint Surgery
  2. Bone and Joint Journal
  3. Clinical Orthopaedics and Related Research
  4. Journal of the AAOS
  5. Journal of Paediatric Orthopaedics
  6. Journal of Orthopaedic Trauma
  7. Indian Journal of Orthopaedics
  8. Orthopaedic Clinics of North America.
  9. Injury
  10. Journal of hand injury
  11. Trauma
  12. Arthroscopy
  13. Journal of Arthroplasty
  14. Journal of Spine Surgery.
  15. Acta Orthopædica Scandinavica
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SDM College of Medical Sciences & Hospital



SDM College of Dental Sciences & Hospital



SDM College of Physiotherapy &  
SDM Institute of Nursing Sciences



Shri Dharmasthala Manjunatheshwara University



SDM Research Institute for Biomedical Sciences



Panoramic View of Campus