



SHRI  
DHARMASTHALA  
MANJUNATHESHWARA  
UNIVERSITY

Ordinance Governing  
**MD RADIODIAGNOSIS**  
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)

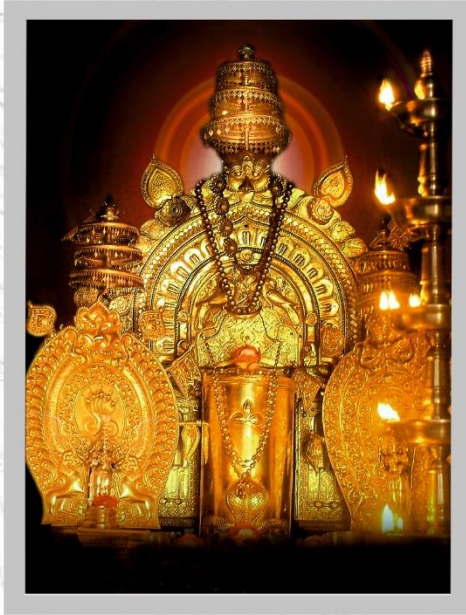
Manjushree Nagar, Sattur, Dharwad - 580 009, Karnataka, India

6<sup>th</sup> Floor, Manjushree Block SDM Medical College Campus

+91 836 2321127,2321126,2321125,2321124 [sdmuniversity.edu.in](http://sdmuniversity.edu.in)

[sdmuo@sdmuniversity.edu.in](mailto:sdmuo@sdmuniversity.edu.in) ; [registrar@sdmuniversity.edu.in](mailto:registrar@sdmuniversity.edu.in)

|| Om Shri Manjunathaya Namaha ||



Shree Kshethra Dharmasthala

**Edition Year : 2019-20**

**Shri Dharmasthala Manjunatheshwara University,**

Manjushree Nagar, Sattur, Dharwad - 580 009, Karnataka, India

Phone: 0836-2321127

email: [sdmuo@sdmuniversity.edu.in](mailto:sdmuo@sdmuniversity.edu.in)


**Published by**


**Registrar**


Shri Dharmasthala Manjunatheshwara University

6<sup>th</sup> Floor, Manjushree Block SDM Medical College Campus

Manjushree Nagar, Sattur, Dharwad - 580 009, Karnataka, India

 +91 836 2321127,2321126,2321125,2321124

 [sdmuo@sdmuniversity.edu.in](mailto:sdmuo@sdmuniversity.edu.in) ; [registrar@sdmuniversity.edu.in](mailto:registrar@sdmuniversity.edu.in)

 [sdmuniversity.edu.in](http://sdmuniversity.edu.in)



SHRI  
DHARMASTHALA  
MANJUNATHESHWARA  
UNIVERSITY

## 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  
DHARMASTHALA  
MANJUNATHESHWARA  
UNIVERSITY

## 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||



SHRI  
DHARMASTHALA  
MANJUNATHESHWARA  
UNIVERSITY

6<sup>th</sup> Floor, 'Manjushree' Building  
SDM Medical College Campus  
Sattur, Dharwad - 580009

0836 247 - 7510 / 7511  
Fax: +918362461651  
registrar@sdmuniversity.edu.in

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

# **COMPETENCY-BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN RADIODIAGNOSIS**

## **I. PREAMBLE:**

The purpose of Post-Graduate education is to create specialists who would provide high-quality health care and to advance the cause of science through research & training.

## **II. GOAL:**

The goal of this program is to impart training in conventional and modern radiology and imaging techniques, so that, the post-graduate student becomes well versed and competent to practice, teach and conduct research in the discipline of Radiology. The student should also acquire basic knowledge in the various sub-specialities of Radiology.

## **III. SPECIFIC LEARNING OBJECTIVES:**

The objective of the program is to train a student to become a skilled and competent radiologist to conduct and interpret various diagnostic/interventional imaging studies (both conventional and advanced imaging), to organize and conduct research and teaching activities and be well versed with medical ethics and legal aspects of imaging/intervention.

## **IV. 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.

## **V. SUBJECT SPECIFIC COMPETENCIES:**

### **A. Cognitive Domain**

A post-graduate student on completing MD (Radio-diagnosis) should acquire knowledge in the following areas, and be able to:

1. Acquire good basic knowledge in the various sub-specialities of Radiology such as chest radiology, neuro-radiology, GI-radiology, uro-radiology, cardio-vascular radiology, musculoskeletal radiology, interventional radiology, emergency radiology, pediatric radiology and women's imaging.
2. Independently conduct and interpret all routine and special radiologic and imaging investigations.
3. Provide radiological services in acute emergency and trauma including its medicolegal aspects.
4. Elicit indications, diagnostic features and limitation of applications of ultrasonography, CT & MRI and should be able to describe the proper cost-effective algorithm of various imaging techniques in a given problem setting.
5. Decide on the various image-guided interventional procedures to be done for diagnosis and therapeutic management.
6. Able to decide on further specialization to be undertaken in any of the branches in Radio-diagnosis such as gastrointestinal radiology, uro-radiology, neuro-radiology, vascular radiology, musculoskeletal radiology, interventional radiology, etc.
7. Able to formulate basic research protocols and carry-out research in the field of radiology- related clinical problems.



8. Acquire knowledge and teaching capabilities to work as a postgraduate student/consultant in Radio-diagnosis and conduct teaching programs for undergraduates, postgraduates as well as paramedical and technical personnel.
9. Interact with other specialists and super-specialists, so that, maximum benefit accrues to the patient.
10. Should be able to organize CME activities in the speciality utilizing modern methods of teaching and evaluation.
11. Acquire knowledge to impart training in both conventional radiology and modern imaging techniques, so that, the postgraduate student is fully competent to practice, teach and do research in the broad discipline of radiology including ultrasound, Computed Tomography and Magnetic Resonance Imaging.
12. Acquire knowledge of interventional radiology.

**B. Affective Domain:**

1. Should be able to function as a part of a team, develop an attitude of cooperation with colleagues, to interact with the patient and the clinician or other colleagues to provide the best possible diagnosis or opinion.
2. Always adopt ethical principles and maintain proper etiquette in dealings with patients, relatives and other health personnel and to respect the rights of the patient including the right to information and second opinion.
3. Develop communication skills to word reports and professional opinion as well as to interact with patients, relatives, peers & paramedical staff for effective teaching.

4. Be humble and accept the limitations in knowledge & skill and to ask for help from colleagues when needed.

5. Breaking bad news: In every area of clinical practice, it is always difficult and awkward to break the bad news to a patient, whether at the time of diagnosis, recurrence, disease progression. Bad news is defined as "any news that adversely and seriously affects an individual's view of his or her future." SPIKES protocol for breaking the bad news can be followed.

S = SETUP. Set up the situation, so it has a good chance of going smoothly. Turn your mobile phone off or give it to someone else, so you are not interrupted. Sit down, make eye contact, and get reasonably close to the patient. Anticipate that the patient will be upset and have some tissues ready.

P = PERCEPTION. Find out the patient's perception of the medical situation. What has he been told about the disease? What are his expectations of treatment? Correct any misconceptions or misunderstandings the patient may have.

I = INVITATION. Find out how much information the patient wants. These days most patients want a lot of information but this is not universally true, especially as the disease progresses and patients may want to focus on "What do we do next?"

K = KNOWLEDGE. Use language that matches the patient's level of education. Be direct. Give a warning that bad news is coming: "I have some serious news to tell you." This will allow the patient to prepare psychologically. After giving the news, stay quiet for at least 10-15 seconds-resist the urge to tell the patient how to feel. Give the patient time to absorb the information and respond.

E = EMPATHIZE. Use empathic statements to respond to patient emotions. This will assist in patient recovery and dampen the psychological isolation which the patient experiences when they hear the bad news. If a patient begins to cry, wait until he is ready to talk; Ask if the patient has questions or concerns and keep asking until he says "no."

S = SUMMARIZE AND STRATEGIZE. Summarize the clinical information and make a plan for the next step, which may be further testing or discussion of treatment options. Be as concrete as possible and check on the patient's understanding of what has been discussed.

### **C. Psychomotor domain**

Practical Training will include two major aspects:

- a. Interpretation of images**
- b. Skill in performing a procedure**

#### **a) Interpretation of images:**

**The student should be able to interpret images on all imaging modalities of diseases of the following organs:**

1. **Musculoskeletal System** - Interpretation of diseases of muscles, soft tissue, bones and joints including congenital, inflammatory, traumatic, endocrine & metabolic, neoplastic and miscellaneous conditions.
2. **Respiratory System** - Interpretation of diseases of the chest wall, diaphragm, pleura and airway; pulmonary infections, pulmonary vasculature; pulmonary neoplasm; diffuse lung disease; mediastinal disease, chest trauma; post-operative lung and X-ray in intensive care.

3. **Cardiovascular System** - Interpretation of diseases and disorders of the cardiovascular system (congenital and acquired conditions) and the role of imaging by conventional radiology, ultrasound, colour Doppler, CT, MRI, Angiography and Isotopes Studies.
4. **Gastro-intestinal tract and hepato-biliary pancreatic system** - Interpretation of diseases and disorders of mouth, pharynx, salivary glands, oesophagus, stomach, small intestine, large intestine, diseases of omentum, peritoneum & mesentery, acute abdomen, abdominal trauma, diseases and disorders of the liver, biliary system and pancreas.
5. **Urogenital System** - Interpretation of various diseases and disorders of the genitourinary system. These include congenital, inflammatory, traumatic, neoplastic, calculus disease and miscellaneous conditions.
6. **Central Nervous System (C.N.S.)** - Interpretation of diseases and disorders of the head, neck and spine covering, congenital, infective, vascular, traumatic neoplastic degeneration metabolic and miscellaneous condition.
7. Imaging in Emergency Medicine.
8. Imaging in Obstetrics and Gynecology.
9. Imaging of Breast and interventional procedures.
10. Imaging of Head & Neck.
11. Imaging of endocrine glands and those involved with metabolic diseases.
12. Clinical applied radionuclide imaging.
13. Interventional Radiology.

## **b) Skills in performing a procedure**

**The student should be able to perform the following procedures:**

1. **Gastrointestinal tract contrast studies:** Barium studies (swallow, upper GI, Follow through, enema); Fistulogram; sialogram; cologram/ileostogram.
2. **Urogenital system:** Excretory urography, MCU, RGU, nephrostogram, genitogram.
3. **Ultrasound:** Studies of the whole body including neonatal transfontanell studies, Doppler studies,
4. **CT scan:** should be able to position a patient, plan study as per the clinical indication, do the reconstruction of images, perform the triple-phase study, perform & interpret advanced applications like CT enterography, CT angiography etc.
5. **MRI:** plan and perform MRI studies of the whole body
6. **DSA:** should be able to describe the techniques, do (if available to the student) transfemoral puncture and insert the catheter, help in angiographic procedures both diagnostic and interventional.
7. **Radiography:** should be able to independently do radiography of common and some important uncommon views of different body parts. This includes positioning, centring of the X-ray beam, setting of exposure parameters, exposing and developing the films. The student should be familiar with not only conventional radiography but with CR and DR systems.

8. **Interventional radiology:** The student should be able to perform simple, common non-vascular procedures under ultrasound and fluoroscopy guidance e.g. abscess drainage, drainage catheter placement, nephrostomy, biliary drainage etc. The student should know common vascular interventions e.g. stricture dilatation using balloon catheters, embolization with gel foam and other agents, names of common catheters, handling of intravenous contrast reactions; techniques, indications and contraindications for various procedures.
  
9. **Optimum patient safety:** The radiology postgraduate student should be able to relate the safety measures predominantly to the modality work areas: sonography, CT, MRI, general radiology and fluoroscopy, interventional radiology, breast imaging, and paediatrics imaging.

**Measures to be taken by the postgraduate student to ensure optimum patient safety:**

- a. Optimize radiation exposure
  
- b. Accountability for radiation protection by healthcare providers
  
- c. Provides an opportunity for informed discussions between patients and healthcare providers.
  
- d. Strive to deliver the lowest dose possible to create diagnostic-quality images and follow the ALARA (as low as reasonably achievable) principle.
  
- e. Assessing the patient's renal and hepatic function and changing the protocol according to the results.

- f. Timely reporting of critical tests, communication of critical results, medication labelling, hand hygiene, preventing infections, medication reconciliation, reducing harm from falls, and performing universal protocols for preventing surgery that involves the wrong site, the wrong procedure, or the wrong person
  - g. Critical tests & examinations are so critical that, regardless of the findings, a telephone or face-to-face report is communicated within a predetermined time.
  - h. Radiographic studies should be labelled with the correct patient identification and right or left markers before the patient begins the radiologic examination to avoid unnecessary radiation exposure and unnecessary administration of IV contrast material.
  - i. Perform medication reconciliation by examining the list of the patient's current medications and ensuring that any medication that would be administered within the radiology department will not result in an adverse event for the patient.
10. **Provide basic and advanced life-saving support services:** (BLS& ALS) in emergencies.

## **VI. SYLLABUS**

### **Course contents:**

#### **a. Anatomy**

Gross and cross sectional anatomy of all the body systems.

#### **b. Pathology**

Gross morphology of pathological conditions of systemic diseases affecting all organ systems.

#### **c. Radiology Course**

This would cover imaging and interventions of diseases affecting all the body systems:

- Chest
- Cardiovascular system
- Musculoskeletal including soft tissue
- Gastrointestinal system
- Hepato-biliary-pancreatic system
- Urogenital (genito-urinary) system
- The central nervous system including head & neck
- Obstetrics & gynaecology
- Breast
- The endocrine and metabolic system
- Clinically applied radionuclide imaging

#### **d) Radiological physics**

1. Introduction of general properties of radiation and matter: Fundamentals of nuclear physics and radioactivity
2. Interaction of x-rays and gamma rays with matter and their effects on irradiated Materials
3. X-ray Generating Apparatus



4. Screen-film radiography
5. Film processing: Darkroom, dry processing, laser /dry chemistry cameras, artefacts
6. Fluoroscopy: Digital including flat-panel units, fluoroscopy cum radiography units
7. Digital radiography: Computed Radiography, Flat panel radiography
8. Other types of equipment: Ultrasound including Doppler, CT, MRI and DSA
9. Contrast Media (Iodinated, MR & Ultrasound) - types, chemical composition, mechanism of action, dose schedule, route of administration, adverse reaction and their management
10. Nuclear Medicine: types of equipment and isotopes in various organ systems and recent Advances
11. Picture Archiving and Communication System (PACS) and Radiology Information System (RIS) to make a filmless department and for Teleradiology
12. Radiation protection, dosimetry and radiation biology
13. Image quality and Quality Assurance (QA)
14. Recent advances in radiology and imaging  
The student should know about the following physics experiments:
  - Check accuracy of kVp and timer of an x-ray unit
  - Check accuracy of congruence of the optical radiation field
  - Check perpendicularity of x-ray beam

- Determine focal spot size
- Check linearity of the timer of the x-ray unit
- Check linearity of mA
- Verification of inverse square law for radiation
- Check film screen contact
- Check film screen resolution
- Determine the total filtration of an x-ray unit
- Processor quality assurance test
- Radiological protection survey of an x-ray unit
- Check compatibility of safe light
- Check performance of view box
- Effect of kVp on x-ray output

**e) Radiography and processing techniques**

1. Processing techniques: includes darkroom and dry processing.
2. Radiography of the musculoskeletal system including extremities.
3. Radiography of the chest, spine, abdomen and pelvic girdle.
4. Radiography of the skull, orbit, sinuses.
5. Contrast techniques and interpretation of GI tract, hepatobiliary tract, pancreas, etc.
6. Contrast techniques and interpretation of the Central Nervous System.
7. Contrast techniques and interpretation of the Cardio Vascular System including the chest.

8. Contrast techniques and interpretation of the Genitourinary System including Obstetrics & Gynaecology.
9. Paediatric Radiology including MCU, genitogram, bone age.
10. Dental, portable and emergency (casualty) radiography.

## **VII. TEACHING AND LEARNING METHODS**

**The training is spread over 3 years and includes the following components:**

1. Physics-related to imaging
2. Rotational posting in various sub-specialities.
3. Lectures: lectures are to be kept a minimum. Certain selected topics can be taken as lectures. Lectures may be didactic or integrated.
  - a) Didactic lectures: Recommended for selected common topics for postgraduate students of all specialties. Few topics are suggested as examples:
    - i) Bio-statistics.
    - ii) Use of the library.
    - iii) Medical code of conduct and medical ethics.
    - iv) National health and disease control programs.
    - v) Communication skills etc.

These topics may preferably be taken-up in the first few weeks of the 1st year.

- b) Integrated Lectures: These are recommended to be taken by multidisciplinary teams for selected topics, e.g. Jaundice, diabetes mellitus, stroke, bone disorders etc.
4. Journal Club: Recommended to be held once a week. All the PG students are expected to attend and actively participate in the discussion and enter in the logbook with relevant details. The presentations would be evaluated using checklists and would carry weightage for internal assessment. The time table for the subject with the names of the students and the moderator should be announced in advance.
5. Subject seminar: Recommended to be held once a week. All the PG students are expected to attend and actively participate in the discussion and enter in the logbook with relevant details. The presentations would be evaluated using checklists and would carry weightage for internal assessment. The

time table for the subject with the names of the students and the moderator should be announced in advance.

6. Case discussion: Recommended to be held once a week. All the PG students are expected to attend and actively participate in the discussion and enter in the logbook with relevant details. The presentations would be evaluated using checklists and would carry weightage for internal assessment. The time table for the case presentation with names of the students should be announced in advance.
7. Clinico Pathological Conference: Recommended once a month for all postgraduate students. Presentation to be done by rotation. Presentations will be assessed using the checklist. If cases are not available due to lack of clinical postmortems, it could be supplemented by published CPCs.
8. Inter-Departmental Meetings: Strongly recommended particularly with departments of Neurology, Surgery, Orthopedics and Medicine at least once a month. These meetings should be attended by postgraduate students and relevant entries must be made in the logbook.

Interesting cases and imaging modalities will be discussed. Emphasis should be given for the radiological differential diagnosis.

9. Mortality Meeting: Will be conducted twice in a year. The postgraduate student should prepare the details regarding the cause of death after going through the case records in detail and should present during the mortality meeting. The death records will be discussed in detail during this meeting.
10. Teaching Skills: Postgraduate students must teach undergraduate students (E.g. Medical, Radiography, Nursing) by taking demonstrations, tutorials, lectures etc. assessment is made using a checklist by medical faculty as well as by the students. Record of the participation is to be kept in a logbook. Training of postgraduate students in Educational Science and Technology is recommended.

11. Continuing Medical Education Programmes (CME): Recommended that at least 1 state-level CME programmes should be attended by each student during the course.
12. Conferences: The postgraduate student would be required to present one poster presentation, to read one paper at a national/state conference and to submit one research paper which should be published or accepted for publication or sent for publication to a peer-reviewed journal, during the period of postgraduation studies so as to make the student eligible to appear the postgraduate degree examination.
13. Research activities: Postgraduate students to be encouraged to carry research activities in the department other than dissertation work.
14. 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 finalization for critical evaluation and another before final submission of the completed work.
15. Maintenance of work dairy/logbook: Every student shall maintain a Log Book/work diary and record the 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. All the procedures performed by the postgraduate students should be entered in the Log Book. All the daily activities including the ward rounds and the routine procedures performed on day to day basis should be entered in the Log Book and it should be verified and signed by the faculty member. The Log Book shall be scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the University practical/clinical examination.

16. The department should encourage e-learning activities.
17. Records: Records, logbooks and marks obtained in the test will be maintained by the Head of the Department and will be made available to the University or MCI.

**Rotations:**

**During the three-year course, suggested rotations within the department are as follows:-**

1. Conventional radiography including contrast procedures like IVU, HSG, barium studies, fluoroscopic guided interventions, fistulogram, and mammography. – 10 months
2. Ultrasonography, Doppler and Ultrasound-guided interventions – 8 months
3. CT and CT guided interventions – 8 months
4. M.R.I. – 4 months
5. Digital subtraction angiography – 4 months

**In the final year, suggested rotations in other departments are as follows:-**

1. Obstetrics and gynaecology – 1 month
2. PET and nuclear medicine – 2 weeks
3. Cardiology – 2 weeks

During each posting, the postgraduate student should be able to perform the procedures and interpret the findings.

## **VIII. ASSESSMENT**

### **a) FORMATIVE ASSESSMENT, during the training programme**

Formative assessment should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self-directed learning and ability to practice in the system.

#### **General Principles**

Internal Assessment should be frequent, cover all domains of learning used to provide feedback, to improve learning. It should also cover professionalism and communication skills. The Internal Assessment should be conducted in theory and practical/clinical examination.

#### **Quarterly assessment during the MD training should be based on:**

1. Journal based / recent advances learning
2. Patient-based / Skill-based learning
3. Self-directed learning and teaching
4. Departmental and interdepartmental learning activity
5. External and Outreach Activities / CMEs
6. Periodic tests: The department should conduct one theory and one practical examination of 100 marks each at the end of an academic term and one



preliminary examination two months before the final examination. The pattern for the preliminary examination should be the same as the final examination.

- a. The student will be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

#### **b) SUMMATIVE ASSESSMENT, i.e., assessment at the end of the training**

The summative examination will be carried out as per the Rules as given in **postgraduate medical education regulations, 2000**.

#### **Postgraduate Examination**

The Post Graduate Examination will be conducted in three parts.

##### 1. Thesis:

Every postgraduate student should carry out work on an assigned research project under the guidance of a recognized Post Graduate Teacher, the result of which should be written up and submitted in the form of a Thesis (Dissertation). Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the postgraduate student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

The thesis should be submitted at least six months before the Theory and Clinical / Practical examination. The thesis will be examined by a minimum of two external examiners, who will not be the examiners for Theory and Clinical examination. A post-graduate student will be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

## 2. Theory Examination

The examinations should be organized based on 'Grading' or 'Marking system' to evaluate and to certify postgraduate student's level of knowledge, skill and competence at the end of the training.

There will be four theory papers, each of three hours duration. All papers would consist of short answer questions (minimum 10) covering all aspects of the course. Total marks for each paper will be 100.

- Paper I: Basic sciences related to Radiology, consists of Radiological Anatomy, Pathology, Basic and Radiation Physics, Imaging Techniques, and Film processing.
- Paper II: Chest, CVS, Musculo-Skeletal, Pediatric Radiology.
- Paper III: Abdominal Imaging including GI, GU, Hepatobiliary, Endocrine and Metabolic, Obstetrics and Gynaecology, Mammography.
- Paper IV: CNS including Head & Neck, Eye, ENT, Recent advances, Interventional Radiology, Nuclear Medicine; Radiology related to clinical specialities.

Note: The distribution of chapters/topics shown against the papers is suggestive only.

3. Practical/clinical and oral Examination (will include cases, spots, ultrasound procedure, physics, implements, etc.)

Practical Examination will have:

1. 3 Cases
2. Film Quiz (30 Spots)

Oral/Viva-voce will include:

- Radiation Physics and quality assurance
- Implements, Catheters and contrast
- Cassettes, films, darkroom, equipment
- Radiographic techniques, Radiological procedures,
- Gross pathology

## **IX. SCHEME OF EXAMINATION:**

Eligibility to appear for the final exam:

Candidates will be allowed to appear for examination only if attendance (Minimum 80%) and internal assessment are satisfactory and the dissertation is accepted.

Criteria of the pass in the final exam:

Obtaining a minimum of 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing the examination as a whole. The examination for M.D. shall be held at the end of the 3<sup>rd</sup> academic year. An academic term shall mean six month's training period.

### **a) Theory: 400 Marks**

There shall be four papers, each of three hours duration. Total marks of each paper will be 100. Questions on recent advances may be asked in any or all the papers. The format of each paper will be the same as shown below.

Type of Questions	No of Questions	Marks for each question	Total Marks
Short essay	10	10	100

**b) Clinical / Practical Examination: 200 Marks**

To elicit competence in clinical skills and to discuss differential diagnostic and therapeutic aspects.

Types of Cases	No. of Cases	Marks
Long Case	1	100
Short Cases	2 (50 marks each)	100
Total	3	200

**c) Viva-voce Examination: 100 Marks**

Aimed at assessing the depth of knowledge, logical reasoning, confidence and oral communication skills.

1. Viva-voce examination – 60 marks
2. Spotters: 30 marks
3. Dissertation presentation & logbook: 10 marks

- (i) 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 given case reports, X-rays, Ultrasound, CT scan & MRI images for interpretation and questions on these as well as the use of instruments will be asked. Student's knowledge on the use of instruments and drugs pertaining to the Radio-diagnosis department will also be evaluated during viva-voce examination. It includes discussion on the dissertation also.

- (ii) The candidate is asked to make a presentation for 8 -10 minutes on the dissertation topic and the review of Log Book.

**d) Maximum Marks:**

Maximum Marks for M.D. (Radio-diagnosis)	Theory	Practical	Viva	Grand Total
	400	200	100	700

### **SUGGESTED READING: Books (latest edition)**

1. Grainger & Allison's Textbook of Diagnostic Radiology (Churchill Livingstone)
2. Textbook of Gastrointestinal Radiology- Gore and Levine (Saunders)
3. MRI of Brain and Spine - Scott Atlas (LWW)
4. Diagnosis of Diseases of the Chest -Fraser
5. Diagnostic Imaging Series: (Amirsys, Elsevier)
6. Abdominal Imaging, Orthopedics, Head and Neck, Neuroradiology, Pediatric Radiology Chest, Obstetrics, Breast
7. MRI in Orthopedics and Sports Injuries - Stoller
8. Skeletal Radiology - Greenspan
9. Abdominal-Pelvic MRI - Semelka (IWW)
10. Caffey's Pediatric Radiology
11. CT and MRI of the whole body- John R. Haaga
12. Textbook of Radiology and imaging - David sulton
13. Diagnostic ultrasound - Carol C. Rumack
14. AIIMS-MAMC-PGI's Comprehensive Textbook of Diagnostic Radiology, Volumes 1, 2, 3.

### **Journals**

1. American Journal of Roentgenology
2. Radiology
3. Seminars in Ultrasound, CT, MRI
4. Radiographics
5. Clinical Radiology
6. British Journal of Radiology
7. Radiological Clinics of North America
8. Pediatric Radiology
9. Australasian Radiology
10. Journal of Computerized Axial Tomography
11. Clinical Imaging
12. MR Clinics of North America
13. Seminars in Roentgenology

**Annexure I**  
**POSTGRADUATE STUDENTS APPRAISAL FORM**

**Name of the Department:**

**Name of the PG Student:**

**Period of Training: FROM.....TO.....**

Sr. No.	PARTICULARS	Not Satisfactory			Satisfactory			More Than Satisfactory			Remarks
		1	2	3	4	5	6	7	8	9	
1.	Patient-based / Skill-based learning										
2.	Self-directed learning and Teaching										
3.	Journal based / recent advances learning										
4.	Departmental and interdepartmental learning activity										
5.	External and Outreach Activities / CMEs										
6.	Thesis / Research work										
7.	Log Book Maintenance										
8.	Patient care										
9.	Interpersonal Skill										
10.	Professionalism										

Publications --- Yes/ No

Remarks\* \_\_\_\_\_

\*REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to the postgraduate student is strongly recommended.

**SIGNATURE OF ASSESSEE**

**SIGNATURE OF CONSULTANT**

**SIGNATURE OF HOD**

## MODEL CHECK-LIST FOR EVALUATION OF JOURNAL REVIEW PRESENTATIONS

Name of the Student:

Name of the Faculty/Observer:

Date:

SL No.	Items for observation during the presentation	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Article chosen was					
2.	The extent of understanding the scope & objectives of the paper by the candidate					
3.	Whether cross-reference has been consulted					
4.	Whether other relevant publications consulted					
5.	Ability to respond to questions on the paper/subject					
6.	Audio-Visual aids used					
7.	Ability to defend the paper					
8.	Clarity of presentation					
9.	Any other observation					
	<b>Total Score</b>					

SIGNATURE OF ASSESSEE

SIGNATURE OF CONSULTANT

SIGNATURE OF HOD



## MODEL CHECK-LIST FOR EVALUATION OF SEMINAR PRESENTATIONS

Name of the Student:

Name of the Faculty/Observer:

Date:

SL No.	Items for observation during the presentation	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Whether other relevant publications consulted					
2.	Whether cross-reference has been consulted					
3.	Completeness of Preparation					
4.	Clarity of presentation					
5.	Understanding of subject					
6.	Ability to answer questions					
7.	Time scheduling					
8.	Appropriate use of Audio-Visual aids					
9.	Overall Performance					
10.	Any other observation					
	<b>Total Score</b>					

**SIGNATURE OF ASSESSEE**

**SIGNATURE OF CONSULTANT**

**SIGNATURE OF HOD**

### MODEL CHECK-LIST FOR EVALUATION OF TEACHING SKILL PRACTICE

SL No.		Strong Point	Weak Point
1.	Communication of the purpose of the talk		
2.	Evokes audience interest in the subject		
3.	The introduction		
4.	The sequence of ideas		
5.	The use of practical examples and/or illustrations		
6.	Speaking style (enjoyable, monotonous, etc., specify)		
7.	Attempts audience participation		
8.	Summary of the main points at the end		
9.	Asks questions		
10.	Answers questions asked by the audience		
11.	The rapport of the speaker with his audience		
12.	Effectiveness of the talk		
13.	Uses AV aids appropriately		

SIGNATURE OF ASSESSEE

SIGNATURE OF CONSULTANT

SIGNATURE OF HOD

## MODEL CHECK-LIST FOR DISSERTATION PRESENTATION

Name of the Student:

Name of the Faculty/Observer:

Date:

SL No.	Points to be considered divine	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Interest shown in selecting a topic					
2.	Appropriate review of literature					
3.	Discussion with guide & other faculty					
4.	Quality of Protocol					
5.	Preparation of proforma					
	<b>Total Score</b>					

SIGNATURE OF ASSESSEE

SIGNATURE OF CONSULTANT

SIGNATURE OF HOD

## CONTINUOUS EVALUATION OF DISSERTATION WORK BY GUIDE / CO-GUIDE

Name of the Student:

Name of the Faculty/Observer:

Date:

SL No.	Items for observation during the presentation	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Periodic consultation with guide/co-guide					
2.	Regular collection of case material					
3.	Depth of analysis/discussion					
4.	Departmental presentation of findings					
5.	Quality of final output					
6.	Others					
	<b>Total Score</b>					

SIGNATURE OF ASSESSEE

SIGNATURE OF CONSULTANT

SIGNATURE OF HOD



SDM College of Medical Sciences & Hospital



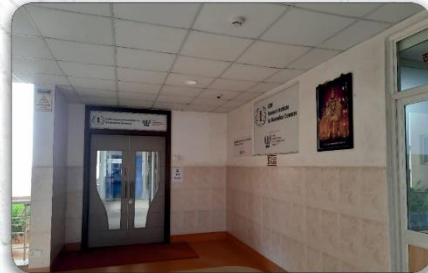
SDM College of Dental Sciences & Hospital



SDM College of Physiotherapy &  
SDM Institute of Nursing Sciences



Shri Dharmasthala Manjunatheshwara University



SDM Research Institute for Biomedical Sciences



Panoramic View of Campus

