

Faculty of Medicine



**JSS Academy of Higher Education & Research**

(Deemed to be University)

Accredited "A" Grade by NAAC

Sri Shivarathreshwara Nagar, Mysuru – 570 015

# Regulation & Syllabus

Post Graduate Degree & Diploma Programs

**RADIO DIAGNOSIS 2016**

***MD/PG Dip***

# Regulation & Syllabus

## **MD RADIO DIAGNOSIS**

**2016**



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**REGULATION AND SYLLABUS FOR  
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**MD & DIPLOMA  
RADIO DIAGNOSIS**

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## CHAPTER I

### REGULATION FOR POST GRADUATE DEGREE AND DIPLOMA COURSES

#### 1. Branch of study

##### Post graduate degree courses

##### Doctor of Medicine

- a) Anaesthesiology
- b) Anatomy
- c) Biochemistry
- d) Community medicine
- e) Dermatology, venereology and leprosy
- f) Emergency medicine
- g) Forensic medicine
- h) General medicine
- i) Hospital administration
- j) Microbiology
- k) Pathology
- l) Paediatrics
- m) Pharmacology
- n) Physiology
- o) Psychiatry
- p) Tuberculosis and Respiratory Medicine
- q) Radio Diagnosis

##### Master of Surgery

- a) General surgery
- b) Obstetrics and gynaecology
- c) Ophthalmology
- d) Orthopaedics
- e) Otorhinolaryngology

##### Post graduate diploma courses

- a) Anaesthesiology (DA)
- b) Child Health (DCH)
- c) Clinical Pathology (DCP)
- d) Dermatology, Venereology & Leprosy (DDVL)
- e) Medical Radio Diagnosis (DMRD)
- f) Obstetrics & Gynaecology (DGO)
- g) Ophthalmology (DO)
- h) Orthopaedics (D Ortho)
- i) Otolaryngology (DLO)
- j) Psychiatric Medicine (DPM)

## **2. Eligibility for admission**

**MD / MS Degree and Diploma courses:** A candidate who has passed final year MBBS examination after pursuing a study in a medical college recognized by the Medical Council of India and has completed one year compulsory rotating internship in a teaching institution or other institution recognized by the Medical Council of India, and has obtained permanent registration of any State Medical Council, shall be eligible for admission.

## **3. Admission**

A candidate desirous of admission to Post Graduate Medical Programmes MD/ MS / PG Diploma Courses is required to complete the application form and submit to the Deemed to be University along with prescribed documents on or before the scheduled date. Eligibility criteria, application form and details of documents to be submitted are available in the Deemed to be University website: [www.jssuni.edu.in](http://www.jssuni.edu.in).

## **4. Registration**

A candidate who has been admitted to postgraduate course shall register in the Deemed to be University within a month of admission after paying the registration fee.

## **5. Intake of students**

The intake of students to each course shall be in accordance with the MCI.

## **6. Duration of study**

**MD, MS Degree Courses:** The course of study shall be 3 completed years including the period of examination.

Provided that in case of students having a recognized 2 years postgraduate diploma course in the same subject, the period of training including the period of examination shall be 2 years.

**Diploma courses:** The course of study shall be 2 completed years including the examination period.

## **7. Methodology of training**

The training of postgraduate for degree/diploma shall be residency pattern, with graded responsibilities in the management and treatment of patients entrusted to his/her care. The participation of the students in all facets of educational process is essential. Every candidate should take part in seminars, group discussions, grand rounds, case demonstration, clinics, journal review meetings, CPC and clinical meetings. Every candidate shall participate in the teaching and training programme of undergraduate students. Training should include involvement in laboratory and experimental work, and research studies. Basic medical sciences students should be posted to allied and relevant clinical departments or institutions. Similarly, clinical subjects' students should be posted to basic medical sciences and allied specialty departments or institutions.

## **8. Attendance, progress and conduct**

A candidate pursuing degree/diploma course, shall work in the concerned department of the institution for the full period as full time student. No candidate is permitted to run a clinic/laboratory/nursing home while studying postgraduate course, nor can he/she work in a nursing home or other hospitals/

clinic/laboratory while studying postgraduate course.

Each year shall be taken as a unit for the purpose of calculating attendance.

Every student shall attend symposia, seminars, conferences, journal review meetings, grand rounds, CPC, case presentation, clinics and lectures during each year as prescribed by the department and not absent himself / herself from work without valid reasons.

Every candidate is required to attend a minimum of 80% of the training during each academic year of the post graduate course. Provided, further, leave of any kind shall not be counted as part of academic term without prejudice to minimum 80% attendance of training period every year.

Any student who fails to complete the course in the manner stated above shall not be permitted to appear for the Deemed to be University Examinations.

## 9. Monitoring progress of study

**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 shall be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any, conducted by the candidate. The work diary shall be scrutinized and certified by the Head of the Department and Head of the Institution, and presented in the Deemed to be University practical/clinical examination.

**Periodic tests:** In case of degree courses of three years duration (MD/MS), the concerned departments shall conduct three tests, two of them be annual tests, one at the end of first year and the other at the end of the second year. The third test shall be held three months before the final examination. The tests shall include written papers, practical / clinical and viva voce. Records and marks obtained in such tests shall be maintained by the Head of the Department and sent to the Deemed to be University, when called for.

In case of diploma courses of two years duration, the concerned departments shall conduct two tests, one of them at the end of first year and the other in the second year, three months before the final examination. The tests shall include written papers, practical / clinical and viva voce.

**Records:** Records and marks obtained in tests shall be maintained by the Head of the Department and shall be made available to the Deemed to be University or MCI.

## 10. Dissertation

Every candidate pursuing MD/MS degree course is required to carry out work on a selected research project under the guidance of a recognised post graduate 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, and comparison of results and drawing conclusions.

Every candidate shall submit to the Controller of Examinations of the Deemed to be 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 Deemed to be University. The synopsis shall be sent through proper channel.

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

The dissertation should be written under the following headings:

- a) Introduction
- b) Aims or Objectives of study
- c) Review of Literature
- d) Material and Methods
- e) Results
- f) Discussion
- g) Conclusion
- h) Summary
- i) References
- j) Tables
- k) Annexure
- l) Proof of Paper presentation and publication

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 Controller of Examinations, six months before final examination, on or before the dates notified by the Deemed to be University.

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

Guide: The academic qualification and teaching experience required for recognition as a guide for dissertation work is as per MCI Minimum Qualifications for Teachers in Postgraduate Medical Education Regulations, 2000. Teachers in a medical college/institution having a total of eight years teaching experience out of which at least five years teaching experience as Assistant Professor gained after obtaining post graduate degree shall be recognised as post graduate teachers.

Co Guide: A Co-guide may be included provided the work requires substantial contribution from a sister department or from another medical institution recognised for teaching/training by JSS Deemed to be University / Medical Council of India.

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 Deemed to be University.

A postgraduate student is required to present one poster presentation, to 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.

## 11. Schedule of examination

The examination for MD / MS courses shall be held at the end of three academic years (six academic terms). The examination for the diploma courses shall be held at the end of two academic years.

For students who have already passed Post Graduate Diploma and appearing for MD examination, the examination shall be conducted after two academic years including submission of dissertation. The Deemed to be University shall conduct two examinations in a year at an interval of four to six months between the two examinations. Not more than two examinations shall be conducted in an academic year.

## 12. Scheme of examination

### MD/MS

**Dissertation:** Every candidate shall carry out work and submit a dissertation as indicated in Sl. No. 10. Acceptance of dissertation shall be a precondition for the candidate to appear for the final examination.

**Written Examination (Theory):** A written examination shall consist of four question papers, each of three hours duration. Each paper shall carry 100 marks. Out of the four papers, the 1st paper in clinical subjects will be on applied aspects of basic medical sciences. Recent advances may be asked in any or all the papers. In basic medical subjects and para-clinical subjects, questions on applied clinical aspects shall also be asked.

### Pattern of Theory Examination Question Paper:

Each paper shall consist of two long essay questions each carrying 20 marks, 3 short essay questions each carrying 10 marks and 6 short answer questions each carrying 5 marks. Total marks for each paper shall be 100.

**Practical/Clinical Examination:** In case of Practical examination for the subjects in Basic Medical Sciences Practical Examination shall be conducted to test the knowledge and competence of the candidates for making valid and relevant observations based on the experimental/Laboratory studies and his ability to perform such studies as are relevant to his subject.

Clinical examination for the subjects in Clinical Sciences shall be conducted to test the knowledge and competence of the candidates for undertaking independent work as a specialist/Teacher, for which candidates shall examine a minimum one long case and two short cases.

The total marks for Practical / clinical examination shall be 200.

**Viva Voce:** Viva Voce shall be thorough and shall aim at assessing the candidate knowledge and competence about the subject, investigative procedures, therapeutic technique and other aspects of the speciality, which form a part of the examination.

The total marks shall be 100 and the distribution of marks shall be as under:

- |     |   |    |
|-----|---|----|
| i)  | For examination of all components of syllabus | 80 |
| ii) | For Pedagogy                                  | 20 |

If there is skills evaluation, 10 marks shall be reserved for Pedagogy and 10 marks for skill evaluation.

**Examiners.** There shall be at least four examiners in each subject. Out of



them, two shall be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the Medical Council of India.

**Criteria for declaring as pass in Deemed to be University Examination:**

A candidate shall pass theory and practical including clinical and viva-voce examination separately and shall obtain 40% marks in each theory paper and not less than 50% marks cumulatively in all the four papers for post graduate degree examination to be declared as pass.

A candidate obtaining less than 40% marks in any paper and obtaining less than 50% of marks cumulatively in all the four papers for postgraduate degree examination shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Controller of Examinations.

**Declaration of class:** A successful candidate passing the Deemed to be University examination in first attempt and secures grand total aggregate 75% of marks or more will be declared to have passed the examination with distinction, 65% but below 75% declared as First Class and 50% but below 65% declared as Second Class.

A candidate passing the Deemed to be University examination in more than one attempt shall be declared as Pass Class irrespective of the percentage of marks.

## **Post Graduate Diploma Examinations**

Diploma examination in any subject shall consist of theory (written papers), Practical / Clinical and Viva - Voce.

**Theory:** There shall be three written question papers each carrying 100 marks. Each paper will be of three hours duration. In clinical subjects one paper out of this shall be on basic medical sciences. In basic medical subjects and Para-clinical subjects, questions on applied clinical aspects shall also be asked.

**Pattern of Theory Examination Question Paper:**

Each paper shall consist of two long essay questions each carrying 20 marks, 3 short essay questions each carrying 10 marks and 6 short answer questions each carrying 5 marks. Total marks for each paper shall be 100.

**Practical Clinical Examination:** In case of practical examination it shall be aimed at assessing competence, skills related to laboratory procedures as well as testing students ability to make relevant and valid observations, interpretation of laboratory or experimental work relevant to his/her subject.

In case of clinical examination, it shall aim at examining clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate shall examine at least one long case and two short cases.

The maximum marks for Practical / Clinical shall be 150.

**Viva Voce Examination:** Viva Voce examination shall be thorough and shall aim at assessing the candidate's knowledge and competence about the subject, investigative procedures, therapeutic technique and other aspects of the speciality, which shall form a part of the examination. The total marks shall be 50.

**Examiners.** There shall be at least four examiners in each subject. Out of

them, two shall be external examiners and two shall be internal examiners. The qualification and teaching experience for appointment as an examiner shall be as laid down by the Medical Council of India.

**Criteria for declaring as pass in Deemed to be University Examination:**

A candidate shall pass theory and practical including clinical and viva-voce examination separately and shall obtain 40% marks in each theory paper and not less than 50% marks cumulatively in all the three papers for post graduate diploma examination to be declared as pass.

A candidate obtaining less than 40% marks in any paper and obtaining less than 50% of marks cumulatively in all the three papers for post graduate diploma examination shall be declared to have failed in the examination. Failed candidate may appear in any subsequent examination upon payment of fresh fee to the Controller of Examinations.

**Declaration of class:** A successful candidate passing the Deemed to be University examination in first attempt and secures grand total aggregate 75% of marks or more will be declared to have passed the examination with distinction, 65% but below 75% declared as First Class and 50% but below 65% declared as Second Class.

A candidate passing the Deemed to be University examination in more than one attempt shall be declared as Pass Class irrespective of the percentage of marks.

**13. Number of candidates per day**

The maximum number of candidates to be examined in Clinical/ practical and Oral on any day shall not exceed eight for M.D./M.S. degree, eight for diploma.

## **CHAPTER II**

### **GOALS AND GENERAL OBJECTIVES OF POSTGRADUATE MEDICAL EDUCATION PROGRAM**

#### **GOAL**

The goal of postgraduate medical education shall be to produce competent specialists and/or medical teachers:

1. Who shall recognize the health needs of the community and carry out professional obligations ethically and in keeping with the objectives of the national health policy.
2. Who shall have mastered most of the competencies, pertaining to the specialty, that are required to be practiced at the secondary and the tertiary levels of the health care delivery system.
3. Who shall be aware of the contemporary advance and developments in the discipline concerned.
4. Who shall have acquired a spirit of scientific inquiry and is oriented to the principles of research methodology and epidemiology and
5. Who shall have acquired the basic skills in teaching of the medical and paramedical professionals.

#### **GENERAL OBJECTIVES**

At the end of the postgraduate training in the discipline concerned the student shall be able to:

1. Recognize the importance to the concerned speciality in the context of the health needs of the community and the national priorities in the health section.
2. Practice the specialist concerned ethically and in step with the principles of primary health care.
3. Demonstrate sufficient understanding of the basic sciences relevant to the concerned specialty.
4. Identify social, economic, environmental, biological and emotional determinants of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive and primitive measure/strategies.
5. Diagnose and manage majority of the conditions in the speciality concerned on the basis of clinical assessment, and appropriately selected and conducted investigations.
6. Plan and advice measures for the prevention and rehabilitation of patients suffering from disease and disability related to the specialty.
7. Demonstrate skills in documentation of individual case details as well as morbidity and mortality rate relevant to the assigned situation.
8. Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behavior in accordance with the societal norms and expectations.
9. Play the assigned role in the implementation of national health programme, effectively and responsibly.

10. Organize and supervise the chosen/assigned health care services demonstrating adequate managerial skills in the clinic/hospital or the field situation.
11. Develop skills as a self-directed learner, recognize continuing education needs; select and use appropriate learning resources.
12. Demonstrate competence in basic concepts of research methodology and epidemiology, and be able to critically analyze relevant published research literature.
13. Develop skills in using educational methods and techniques as applicable to the teaching of medical/nursing students, general physicians and paramedical health workers.
14. Function as an effective leader of a health team engaged in health care, research or training.

**STATEMENT OF THE COMPETENCIES:** Keeping in view the general objectives of postgraduate training, each discipline shall aim at development of specific competencies which shall be defined and spelt out in clear terms. Each department shall produce a statement and bring it to the notice of the trainees in the beginning of the programme so that he or she can direct the efforts towards the attainment of these competencies.

**COMPONENTS OF THE POSTGRADUATE CURRICULUM:**

The major components of the Postgraduate curriculum shall be:

- Theoretical knowledge
- Practical and clinical skills
- Dissertation skills.
- Attitudes including communication skills.
- Training in Research Methodology, Medical Ethics and Medicolegal aspects.

(Source: Medical Council of India, Regulations on Postgraduate Medical Education, 2000)

## CHAPTER III

### 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 shall be 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. Model checklists are given in this chapter which may be copied and used.

The learning outcomes to be assessed should include:

1. Personal Attitudes.
2. Acquisition of Knowledge.
3. Clinical and operative skills and
4. Teaching skills.

**1. Personal Attitudes:** The essential items are:

- a) Caring attitude.
- b) Initiative.
- c) Organisational ability.
- d) Potential to cope with stressful situations and undertake responsibility.
- e) Trustworthiness and reliability.
- f) To understand and communicate intelligibly with patients and others.
- g) To behave in a manner that establishes professional relationships with patients and colleagues.
- h) Ability to work in a team.
- i) 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.

**2. 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.

- a) **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 (see Model Checklist – I, Chapter III)
- b) **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 III)

- c) **Clinico-pathological conferences.** This should be a multidisciplinary 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 for seminar.
- d) **Medical Audit.** Periodic morbidity and mortality meeting shall be held. Attendance and participation in these must be insisted upon. This may not be included in assessment.

### 3. Clinical skills:

- a. **Day to Day work:** Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates' sincerity and punctuality, analytical ability and communication skills (see Model Checklist III, Chapter III).
  - b. **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 III).
  - c. **Clinical and Procedural 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 III).
4. **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 (See Model checklist V, Chapter III).
  5. **Periodic tests:** In case of degree courses of three years duration, the department 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. In case of diploma courses of two year duration, the departments may conduct two tests. One of them at the end of first year and the other in the second year, three months before the final examination. The tests may include written papers, practical / clinical and viva voce.
  6. **Work diary:** 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.
  7. **Records:** Records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the Deemed to be University or MCI.
  8. **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 III. 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 counseled 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 him or herself right.

### Format of Model Check Lists

#### Check List-I

#### 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 presentation	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Article chosen was					
2.	Extent of understanding of scope & objectives of the paper by the candidate					
3.	Whether cross references have 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>					

## Check List – II

### MODEL CHECK-LIST FOR EVALUATION OF SEMINAR PRESENTATIONS

**Name of the Student:**

**Name of the Faculty/Observer:**

**Date:**

<b>Sl No</b>	<b>Items for observation during presentation</b>	<b>Poor 0</b>	<b>Below Average 1</b>	<b>Average 2</b>	<b>Good 3</b>	<b>Very Good 4</b>
1.	Whether other relevant publications consulted					
2.	Whether cross references have 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>					



### Check List - III

#### MODEL CHECK LIST FOR EVALUATION OF CLINICAL WORK IN WARD / OPD

(To be completed once a month by respective Unit Heads,  
including posting in other departments)

**Name of the Student:**

**Name of the Faculty/Observer:**

**Date:**

SI No	Points to be considered	Poor 0	Below Average 1	Average 2	Good 3	Very Good 4
1.	Regularity of attendance					
2.	Punctuality					
3.	Interaction with colleagues and supportive staff					
4.	Maintenance of case records					
5.	Presentation of cases during rounds					
6.	Investigations work up					
7.	Beside manners					
8.	Rapport with patients					
9.	Counseling patient's relatives for blood donation or Postmortem and Case follow up.					
10.	Overall quality of ward work					
	<b>Total Score</b>					

**Check List - IV**  
**EVALUATION FORM FOR CLINICAL PRESENTATION**

**Name of the Student:**

**Name of the Faculty:**

**Date:**

<b>Sl No</b>	<b>Points to be considered</b>	<b>Poor 0</b>	<b>Below Average 1</b>	<b>Average 2</b>	<b>Good 3</b>	<b>Very Good 4</b>
1.	Completeness of history					
2.	Whether all relevant points elicited					
3.	Clarity of Presentation					
4.	Logical order					
5.	Mentioned all positive and negative points of importance					
6.	Accuracy of general physical examination					
7.	Whether all physical signs elicited correctly					
8.	Whether any major signs missed or misinterpreted					
9.	Diagnosis: Whether it follows logically from history and findings					
10.	Investigations required <ul style="list-style-type: none"> <li>• Complete list</li> <li>• Relevant order</li> <li>• Interpretation of investigations</li> </ul>					
11.	Ability to react to questioning Whether it follows logically from history and findings					
12.	Ability to defend diagnosis					
13.	Ability to justify differential diagnosis					
14.	Others					
	<b>Total Score</b>					

## Check List - V

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

SI 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.	Rapport of speaker with his audience		
12.	Effectiveness of the talk		
13.	Uses AV aids appropriately		

## Check List - VI

### MODEL CHECK LIST FOR DISSERTATION PRESENTATION

**Name of the Student:**

**Name of the Faculty:**

**Date:**

<b>Sl No</b>	<b>Points to be considered</b> <b>divine</b>	<b>Poor</b> <b>0</b>	<b>Below</b> <b>Average</b> <b>1</b>	<b>Average</b> <b>2</b>	<b>Good</b> <b>3</b>	<b>Very</b> <b>Good</b> <b>4</b>
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>					

**Check List - VII**

**CONTINUOUS EVALUATION OF DISSERTATION WORK  
BY GUIDE / CO GUIDE**

**Name of the Student:**

**Name of the Faculty:**

**Date:**

<b>SI No</b>	<b>Items for observation during presentations</b>	<b>Poor 0</b>	<b>Below Average 1</b>	<b>Average 2</b>	<b>Good 3</b>	<b>Very Good 4</b>
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>					





## LOG BOOK

**Table 3:** Diagnostic and Operative procedures performed

Name:

Admission year:

College:

<b>Date</b>	<b>Name</b>	<b>ID No.</b>	<b>Procedure</b>	<b>Category O, A, PA, PI*</b>

**\* Key:**

O - Washed up and observed

A - Assisted a more senior Surgeon

PA - Performed procedure under the direct supervision of a senior Surgeon  
PI - Performed independently



### Model Overall Assessment Sheet

SI No	Faculty Member & Others	Name of Student and Mean Score*																			
		A	B	C	D	E	F	G	H	I	J										
1.	<b>Journal Review Presentations</b>																				
2.	<b>Seminars</b>																				
3.	<b>Clinical work in wards</b>																				
4.	<b>Clinical presentation</b>																				
5.	<b>Teaching skill practice</b>																				
	<b>Total Score</b>																				

Note: Use separate sheet for each year.

**Signature of HOD**

**Signature of Principal**

The above overall assessment sheet used along with the logbook should form the basis for certifying satisfactory completion of course of study, in addition to the attendance requirement.

\* KEY:

**Mean score** : Is the sum of all the scores of checklists 1 to 7.  
**A, B, .....** Name of the trainees.

## Chapter IV

### Medical Ethics Sensitisation and Practice

#### Introduction

There is now a shift from the traditional individual patient- doctor relationship and medical care. With the advances in science and technology and the needs of patients, their families and the community, there is an increased concern with the health of society. There is a shift to greater accountability to the society. Doctors and health professionals are confronted with many ethical problems. It is, therefore necessary to be prepared to deal with these problems. To accomplish the Goal and General Objective stated in Chapter II and develop human values it is urged that ethical sensitisation be achieved by lectures or discussion on ethical issues, clinical discussion of cases with an important ethical component and by including ethical aspects in discussion in all case presentation, bedside rounds and academic postgraduate programmes.

#### Course Contents

##### 1. Introduction to Medical Ethics

- What is Ethics?
- What are values and norms?
- Relationship between being ethical and human fulfillment.
- How to form a value system in one's personal and professional life.
- Heteronomous Ethics and Autonomous Ethics.
- Freedom and personal Responsibility.

##### 2. Definition of Medical Ethics

- Difference between medical ethics and bio-ethics
- Major Principles of Medical Ethics
  - Beneficence = fraternity
  - Justice = equality
  - Self determination (autonomy) = liberty

##### 3. Perspective of Medical Ethics

- The Hippocratic Oath.
- The Declaration of Helsinki.
- The WHO Declaration of Geneva.
- International code of Medical Ethics. (1993)
- Medical Council of India Code of Ethics.

##### 4. Ethics of the Individual

- The patient as a person.
- The Right to be respected.
- Truth and Confidentiality.
- The autonomy of decision.
- The concept of disease, health and healing.
- The Right to health.
- Ethics of Behaviour modification.
- The Physician – Patient relationship.
- Organ donation.

##### 5. The Ethics of Human life

- What is human life?
- Criteria for distinguishing the human and the non-human.

- Reasons for respecting human life.
- The beginning of human life.
- Conception, contraception.
- Abortion.
- Prenatal sex-determination.
- In vitro fertilization (IVF).
- Artificial Insemination by Husband (AIH).
- Artificial Insemination by Donor (AID).
- Surrogate motherhood.
- Semen Intra-fallopian Transfer (SIFT).
- Gamete Intra-fallopian Transfer (GIFT).
- Zygote Intra-fallopian Transfer (ZIFT).
- Genetic Engineering.

## **6. The Family and Society in Medical Ethics**

- The Ethics of human sexuality.
- Family Planning perspectives.
- Prolongation of life.
- Advanced life directives – The Living Will
- Euthanasia
- Cancer and Terminal Care

## **7. Profession Ethics**

- Code of conduct.
- Contract and confidentiality.
- Charging of fees, Fee-splitting.
- Prescription of drugs.
- Over-investigating the patient.
- Low – Cost drugs, vitamins and tonics.
- Allocation of resources in health care.
- Malpractice and Negligence.

## **8. Research Ethics**

- Animal and experimental research / humaneness.
- Human experimentation.
- Human volunteer research — Informed Consent Drug trials.

## **9. Ethical workshop of cases**

- Gathering all scientific factors.
- Gathering all human factors.
- Gathering all value factors.
- Identifying areas of value — conflict, setting of priorities
- Working out criteria towards decisions.

## **Recommended Reading**

1. Francis C.M., Medical Ethics, 1 Ed, 1993, Jaypee Brothers, New Delhi.
2. Good Clinical Practices:GOI Guidelines for clinical trials on Pharmaceutical Products in India ([www.cdsco.nic.in](http://www.cdsco.nic.in))
3. INSA Guidelines for care and use of Animals in Research – 2000.
4. CPCSEA Guidelines 2001 ([www.cpcsea.org](http://www.cpcsea.org).)
5. Ethical Guidelines for Biomedical Research on Human Subjects, 2000, ICMR, New Delhi.
6. ICMR Guidelines on animal use 2001, ICMR, New Delhi.

## **CHAPTER V - Syllabus**

### **M D RADIO DIAGNOSIS**

#### **Goal:**

Goal of the course is to orient and train the students on different aspects of diagnostic radiology so that the resident is trained in all aspects of the diagnostic radiology and work independently in secondary in tertiary hospitals.

#### **Objectives:**

In order to achieve the goal of this course, following objectives are to be accomplished by the time the candidate completes the 3 years course.

Three broad domains of the objectives are:

1. Cognitive domain (Knowledge)
2. Psychomotor domain (Skills)
3. Attitudinal domain (Human values, ethical practice etc.)

#### **Cognitive Domain (Knowledge)**

- Describe aetiology, pathophysiology, and principles of diagnosis and management of common problems including emergencies, in adults and children.
- Demonstrate understanding of basic sciences relevant to this specialty.
- Identify important determinants in a case (eg social, economic, environmental) and take them into account for planning therapeutic measures.
- Recognize conditions that may be outside the area of specialty/competence and to refer them to proper specialist or ask for help.
- Advice regarding the management (including interventional radiology) of the case and to carry out the management effectively.
- Update oneself by self-study and by attending courses, seminars, conferences and workshop which are relevant to the field of radio-Diagnosis.
- Carry out guided research with the aim of publishing his/her work and presenting work at various scientific fora.

#### **Psychomotor Domain (Skills)**

- Take a proper clinical history, examine the patient, perform essential diagnostic/interventional procedures and interpret the results to come to a reasonable diagnosis or differential diagnosis in the condition.
- Provide basic life saving support service in emergency situations.
- Undertake complete patient monitoring including the care of the patient.

#### **Attitudinal Domain (Human values, ethical practice etc.)**

- Adopt ethical principles in all aspects of his/her practice. Professional honesty and integrity to be fostered.
- Develop communication skills in order to explain the various options available in management and to obtain a true informed consent from the patient.
- Be humble and accept the limitations of his knowledge and skills and to

- ask for help from colleagues/ seniors when needed.
- Respect patient rights and privileges including patient's right to information and right to seek a second opinion.

## **Course Contents**

### **1. BASIC SCIENCES RELATED TO RADIO-DIAGNOSIS**

Radiological anatomy, embryology physiology and pathology.

### **2. PHYSICS RELATED TO RADIO-DIAGNOSIS**

- Radiation physics and Radio-biology,
- Radiological anatomy and pathology of various organ systems
- Imaging techniques,
- Radiography.

Fundamentals of electromagnetic radiation, X-Ray production, characteristic properties of X-Rays, units of radiation, radiation measurement, X-ray equipments, X-Ray films, intensifying screens, other X-Ray appliances, dark room equipments and procedures, IITV, cinefluorography, tomography.

- Quality assurance.
- Radiation hazards and principle and methods of radiation protection.
- Contrast media: types, chemistry, mechanisms of action, dose schedule, routes of administration, their potential adverse reactions and management.
- Clinical applications of important isotopes and instrumentation in Nuclear medicine with advances in both.
- Physics and applications of advanced imaging i.e., Ultrasound, CT, MRI, Angiography (DSA), PET etc.

### **3. RESPIRATORY SYSTEM**

Diseases of the chest wall, diaphragm, pleura and airways; pulmonary infections; pulmonary vasculature; pulmonary neoplasms; diffuse lung disease; mediastinal disease; chest trauma; post-operative lung and X-Rays in intensive care.

- Should be able to localize the chest pathology into one of the following compartments: pulmonary, pleural, mediastinal, extra-pleural, extra-thoracic, diaphragmatic, infradiaphragmatic.
- Recognize chest pathology that requires urgent or emergency treatment and describe this in an adequate manner: Pneumothorax, traumatic aortic rupture, esophageal rupture, acute pulmonary embolism, CHF and tracheo-bronchial foreign bodies.
- Recognize acute and chronic patterns of bacterial and viral pneumonia's, occupational diseases, allergic states.
- Recognize acute and chronic cardiac failure patterns and non-cardiogenic edemas.
- Understand the radiographic features and precipitating causes of adult and infant respiratory distress syndrome.
- Recognize and describe appropriately the various manifestations of benign and malignant neoplasm's of the lung.
- Congenital Diseases of the lungs and Diaphragm

### **4. GASTROINTESTINAL (GIT) AND HEPATO-BILIARY-PANCREATIC SYSTEM**

Diseases and disorders of mouth, pharynx, salivary glands, esophagus, stomach, small intestine, large intestine, diseases of omentum, peritoneum and mesentery, acute abdomen, abdominal trauma using conventional and newer imaging methods like CT, MRI, DSA, isotope studies.

Diseases and disorders of hepato-biliary-pancreatic system using conventional & newer imaging methods.

- a. Learn to evaluate the clinical condition & needs of a patient and to decide the appropriate studies and approach for examining the GIT or hepato-biliary-pancreatic system of a patient.
- b. Learn a proper approach to fluoroscopy: this includes developing proficiency in GIT fluoroscopy, mastering the equipment and using proper radiation protection measures (both for the patient and the operator).
- c. Learn the basic pathology and patho-physiology of GIT/hepato-biliary-pancreatic diseases.
- d. Learn to communicate the findings both at fluoroscopy and in films, in an accurate, succinct and meaningful way.
- e. Learn the technique and applications of solography of colour doppler
- f. Learn the technique and applications of CT and MRI in hepato-biliary pathologies

## **5. GENITO-URINARY SYSTEM**

Imaging: conventional, ultrasound, CT, MRI, angiography; of various diseases and disorders of genitourinary system. These includes: congenital, inflammatory, traumatic, neoplastic, calculus and miscellaneous conditions.

- a. Recognize and evaluate emergency conditions involving the urinary tract including trauma, infection, vascular compromise and obstruction.
- b. Recognize and understand the patho-physiology of stone disease.
- c. Recognize patterns of infectious diseases and the modalities necessary for diagnostic evaluation.
- d. Understand the complete evaluation of renal mass lesions and the evaluation of other urinary tract neoplasms, including the detection and staging of the tumor.
- e. Recognize the difference between the pattern of diseases affecting the genito-urinary tract of adults and that of children and understand and identify the common conditions affecting the paediatric genito-urinary system on imaging.
- g. Learn the technique of IUUV, RGU & MCU.

## **6. MUSCULOSKELETAL SYSTEM**

Imaging (Conventional, ultrasound, CT, MRI, angiography, Radio-isotope studies) and interpretation of diseases of muscles, soft tissue, bones and joints including congenital, inflammatory, traumatic, neoplastic and miscellaneous conditions.

- a. Communicate precisely and cogently radiographic descriptions of bone and joint trauma.
- b. Differentiate various forms of arthritis and know correlative laboratory and clinical findings.
- c. Enumerate the radiographic features that differentiate benign and malignant bone tumors with a basic familiarity of more common tumors.
- d. Know radiographic features of acute and chronic osteomyelitis and discitis (including tuberculosis).
- e. Recognize differential features of osteoporosis (including Bone Mineral Density or BMD assessment techniques e.g; US,CT,DEXA) including various endocrine and metabolic diseases e.g; osteomalacia, hyperparathyroidism etc.
- f. Know the application and interpretation of ultrasound / CT / MRI / angiography in one or more of the above situations.
- g. Learn USG guided aspiration of fluids and injection contrast in to joints

## **7. CARDIOVASCULAR RADIOLOGY**

Diseases and disorders of cardiovascular system including congenital conditions and the role of imaging by conventional, ultrasound, Echo, color-Doppler, CT, MRI, angiography (including DSA) and radionuclide studies. It also includes interventional procedures e.g; balloon angioplasty, embolization etc.

- a. Understand the anatomy and common pathology of congenital and acquired cardiac conditions.
- b. Correlate plain film findings of common congenital abnormalities with those shown by angiography.
- c. and explain the pathophysiology including abnormal pressure measurements.
- d. Correlate plain film findings and the echocardiographic studies of patients with acquired valvular diseases and other common pathologic conditions including pericardial pathology.
- e. Understand the role of newer modalities like CT/MRI, in aortic diseases e.g., aorto-arteritis, aortic dissection and aortic aneurysm.
- f. Should be able to perform fluoroscopy on patients before and after valve replacement and identify those with complications after valve replacement.
- g. Understand the principle and logic behind various interventional procedures carried out in the cardiovascular labs e.g; PTCA, balloon dilatation of valvular lesions, septostomy etc.
- h. Understanding the principles of technique of CT coronary angiography, calcium scoring and MRI cardiac diseases

## **8. NEURORADIOLOGY**

Includes imaging (using conventional and newer methods) and interpretation of various diseases and disorders of the head, neck and spine covering congenital lesions, infective lesions, vascular lesions, traumatic conditions and neoplasia. It also includes a number of interventional procedures carried out in the department of neuroradiology.

- a. Know detailed normal neuro-imaging anatomy on different imaging modalities.
- b. Identify pathologic conditions (listed under the content) on images acquired using different techniques and communicate the report in a concise manner.
- c. Participate in daily neuroradiology conferences held with the neurosurgery or neurology units.
- i. Learn the technique of Lumbar puncture for CT cisternography

## **9. ANGIOGRAPHY AND INTERVENTIONAL RADIOLOGY**

- a. Evaluate the requisition for appropriate clinical information to determine if additional information is needed.
- b. Determine or select appropriate diagnostic procedure for the clinical problem.
- c. Assist and perform appropriate procedures under supervision and modify procedures based on observed abnormalities (pathology).
- d. Know the potential risks and complications of procedures performed.
- e. Know normal vascular anatomy applicable to angiographic procedures performed and know normal anatomy and landmarks to perform other non-vascular procedures.
- f. Present interesting cases in the departmental meets.

## **10. PAEDIATRIC RADIOLOGY**

Common diseases and disorders of different organ systems covering congenital, inflammatory, traumatic, neoplastic and other miscellaneous conditions, using both conventional and newer imaging methods.

- a. Understand the appropriate indications for various imaging procedures and determine that the patient has been properly prepared for the procedure.
- b. Know the standard radiographic views for paediatric examinations.
- c. Learn to recognize and evaluate imaging manifestations (on conventional and newer methods) of common paediatric conditions occurring in the head/neck, chest, abdomen/pelvis and in the musculoskeleton.
- d. Perform paediatric fluoroscopic examinations with skill and accuracy.
- e. Understand and apply the knowledge and principle of radiation protection, both for the child and the operator.

#### **11. RADIOLOGY IN EMERGENCY MEDICINE**

- a. Know indications for and limitations of the common emergency imaging procedures.
- b. Determine and direct radiography in emergency patients and interpret the radiographs in emergency patients.
- c. Ability to evaluate incomplete or unsatisfactory examinations and determine additional imaging studies required.
- d. Communicate findings, diagnosis and other relevant information to the emergency room physician.
- e. He/she should be able to perform (some under supervision) and interpret special imaging procedures needed in emergency room e.g; barium studies, excretory urography, CT, ultrasound, Doppler and angiography.

#### **12. ONCOLOGIC RADIOLOGY**

- a. Understand pathology and patho-physiology of common neoplasms.
- b. Learn the algorithmic approach to image these patients based on the suspected disease, its biological behaviour and potential and limitations of various imaging modalities.
- c. Perform appropriate investigation (both conventional and newer methods), interpret the results and reach at a reasonable diagnosis/ differential diagnosis based on the clinical and biochemical results.
- d. Learn to communicate the results in a precise way in a written report to the concerned unit.
- e. Present interesting cases in the departmental meets.
- f. Follow up the post surgical specimens and compare with pre operative imaging reports

#### **13. NUCLEAR MEDICINE**

- a. Interpret common nuclear medicine examinations (including cardiac cases).
- b. He /she should be able to evaluate the examinations for completion and determine what further images (including non nuclear medicine) need to be done.
- c. He/she should have a good understanding of the physical and biological properties of the commonly used radiopharmaceuticals, nuclear medicine instruments and safe handling of isotopes and basic radiation safety measures while dealing with isotopes.

#### **14. GENERAL RADIOLOGY**

- a. Learns to direct and perform radiography on patients.



- b. He/she should be able to decide on further imaging views based on the clinical suspicion and the initial imaging.
- c. Write reports on the radiographs obtained in a methodical, concise and precise way and communicate it to the referring unit.
- d. Present interesting cases in the departmental meets.

**15. ULTRASOUND**

- a. Determine or select the appropriate diagnostic procedure for the clinical problem.
- b. Demonstrate proficiency in patient scanning using appropriate techniques and instrumentation.
- c. Modify the procedure, if required, based upon the observed abnormalities (pathology).
- d. Analyze the results of the diagnostic procedure, make diagnosis and record the findings.
- e. Communicate findings, diagnosis and other relevant information to the referring physician.
- f. Present interesting ultrasound cases in the departmental conferences / meetings.

**16. CT**

- a. The resident will review the daily body CT schedule and based upon the known clinical information and review of other radiologic studies of the same patient done earlier, select the most appropriate CT imaging protocol for the each patient. This may include altering an existing CT protocol to provide the most appropriate examination for an individual patient.
- b. Develop a working knowledge of the actual performance of the CT examinations. This includes starting intravenous lines, amount and timing of injecting i.v. contrast, and actual operation of CT machine.
- c. Review and report all the completed body CT examinations. Initially this will be under the supervision of the seniors but later independently – but all reports will be signed by the faculty incharge.
- d. Participate and present CT cases in departmental and inter departmental meets.

**17. MRI**

- a. The resident will review the daily quality assurance program of the MRI.
- b. Review the MRI requests and plan the investigations appropriate to the clinical condition of the patient.
- c. Develop a working knowledge of the actual performance of the MR examinations. This includes starting intravenous lines, amount and timing of injecting i.v. contrast, and actual operation of MR machine.
- d. Review and report all the completed body MR examinations. Initially this will be under the supervision of the seniors but later independently – but all reports will be signed by the faculty incharge.
- e. Participate and present MR cases in departmental and inter departmental meets.

**18. MAMMOGRAPHY:**

The resident must know the basics of mammographic principles and its Clinical applications.

**19. To acquire detailed knowledge on AERB, radiation protection and**

## PCPNDT ect.

### Teaching / Learning activities

A candidate pursuing the course should work in the institution as a full time student. No candidate should be permitted to run a clinic / laboratory / nursing home while studying postgraduate course. Each year should be taken as a unit for the purpose of calculating attendance.

Every student shall attend teaching and learning activities during each year as prescribed by the department and not absent himself / herself from work without valid reasons.

A list of teaching and learning activities designed to facilitate students acquire essential knowledge and skills outlined is given below.

- 1. Lectures:** Lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics. Lectures may be didactic or integrated.
  - a. Didactic Lectures:** Recommended for selected common topics for post graduate students of all specialities. Few topics are suggested as examples:
    - i. Bio-statistics
    - ii. Use of library
    - iii. Research methods
    - iv. Medical code of conduct and medical ethics
    - v. National Health and Disease Control Programmes
    - vi. Communication skills etc.

These topics may preferably taken up in the first few weeks of the 1<sup>st</sup> year.

- b. Integrated Lectures:** These are recommended to be taken by multidisciplinary teams for selected topics, eg. Jaundice, diabetes mellitus, Thyroid, etc.

- 2. Journal Club:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the log book relevant details. Further, every candidate must make a presentation from the allotted journal(s), selected articles at least four times a year and a total of 12 seminar presentations in three years. The presentations would be evaluated using check lists and would carry weightage for internal assessment (See checklist in chapter IV). A time table with names of the student and the moderator should be announced at the beginning of every year.

- 3. Subject Seminar:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the log book relevant details. Further, every candidate must present on selected topics at least four times a year and a total of 12 seminar presentations in three years. The presentations would be evaluated using check lists and would carry weightage for internal assessment (See checklist in chapter IV). A time table for the subject with names of the student and the moderator should be scheduled at the beginning of the year.

- 4. Student symposium:** Recommended as an optional multi disciplinary programme. The evaluation may be similar to that described for subject seminar.

- 5. Ward rounds:** Ward rounds may be service or teaching rounds.

- a. Service rounds: Postgraduate students and interns should do rounds every day for the care of the patients. Newly admitted patients should be worked up by the PGs and presented to the seniors the following day.
- b. Teaching rounds: Every unit should have 'grand rounds' for teaching purpose. A diary should be maintained for day to day activities by the students.
- c. A minimum of 40 clinical cases must be seen every year.

d. Entries of (a), (b) and (c) should be made in the log book.

**6. Clinico – pathological conference:** Recommended at least once in three months for all post graduate students. Presentation shall be done by rotation. If cases are not available due to lack of clinical postmortems, it could be supplemented by published CPCs.

**7. Inter departmental meetings:** Strongly recommended particularly with departments of Pathology and Radio – diagnosis at least once a week. These meetings should be attended by post graduate students and relevant entries must be made in the log book.

- Pathology: A dozen interesting cases may be chosen and presented by the post graduate students and discussed by them as well as the senior staff of the department. The staff of Pathology department would then show the slides and present final diagnosis. In these sessions the advanced immuno-histo-chemical techniques, the burgeoning markers & other recent development can be discussed.
- Radio–diagnosis: Interesting cases and the imaging modalities should be discussed.

**8. Teaching Skills:** Post graduate students must teach under graduate students (eg. medical, nursing) by taking demonstrations, bed side clinics, tutorials, lectures etc. Assessment is made using a checklist by surgery faculty as well students. (See model checklist in Chapter IV). Record of their participation shall be kept in log book. Training of post graduate students in educational science and technology is recommended.

**9. Continuing medical education programmes (CME):** Recommended that at least 2 state level CME programmes should be attended by each student in 3 years.

**10. Conferences:** Attending conferences is optional. However it is encouraged.

#### **Dissertation:**

1. Every candidate pursuing MD degree course is required to carry out work on a selected research project under the guidance of a recognised post graduate teacher. The results of such a work shall be submitted in the form of a dissertation.
2. 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, comparison of results and drawing conclusions.
3. The guide can be from the department of Radio-diagnosis while co-guides will be from either the department of Radio-diagnosis or other disciplines related to the dissertation topic.
4. Every candidate shall submit a thesis protocol to the Registrar (Evaluation) of the Deemed to be University in the prescribed proforma containing particulars of proposed dissertation work four months from the date of commencement of the course. The thesis protocol shall be sent through the proper channel.

Protocol in essence should consist of:-

- a) Introduction and objectives of the research project.
- b) Brief review of literature

- c) Suggested material and methods
- d) Bibliography
5. Such thesis protocol will be reviewed and the dissertation topic will be registered by the Institute. No change in the dissertation topic or guide shall be made without prior approval of the Deemed to be University.
6. Submission of dissertation.  
Thesis will be submitted at the end of two and a half (2.5) years. Thesis should consist of:
  - a) Introduction
  - b) Review of literature
  - c) Aims and objectives
  - d) Material and methods
  - e) Results
  - f) Discussion
  - g) Summary and Conclusions
  - h) Tables
  - i) Annexures
  - j) Bibliography
7. The written text of 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 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.
8. 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 Deemed to be University.
9. The dissertation work is an essential precondition for a candidate to appear in the Deemed to be University examination.
10. For some more details regarding guide etc., please see Chapter I and for books on research methodology, ethics, etc., see Chapter IV.

### **Monitoring Learning Progress**

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only also helps teachers to evaluate students, but also students to evaluate themselves. The monitoring shall be 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:

1. Personal attitudes
2. Acquisition of knowledge
3. Clinical and operative skills
4. Teaching skills
5. Dissertation

#### **1. Personal Attitudes:** The essential items are:

- Caring attitude
- Initiative
- Organizational ability
- Potential to cope with stressful situations and undertake responsibility
- Trust worthiness and reliability
- To understand and communicate intelligibly with patients and others
- To behave in a manner which establishes professional relationships with

- patients and colleagues
- Ability to work in a 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.
- Integrity of character is an essential personal attribute

**2. 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 (see Model Checklist – I, 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 presentation(s) are to be assessed using a checklist similar to that used for seminar.

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

### **3. Clinical 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)

**Clinical Meeting:** 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 Procedural 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)

**4. 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. (See Model Checklist V, Chapter IV)

**5. 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 Deemed to be University for registration, again before finalization for critical evaluation and another before final submission of the completed work (see Model Checklist IV & VII, Chapter IV)

- 6. Periodic tests:** The department 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, practical / clinical and viva voce.
- 7. Work diary / Look 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.
- 8. Records:** Records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the Deemed to be University or MCI.

### **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 counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommended 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**

- 1. Theory:** There shall be four question papers, each of three hours duration. Each paper shall consist of two long essay questions each questions 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 sciences related to Radiology-Radiological Anatomy, Physiology, pathology, Radiology Physics including basics of Ultrasound, CT, MRI, Radiation Protection.

**Paper – II -** Respiratory system, Cardiovascular system, Neuroradiology including Head and Neck, Musculoskeletal

**Paper – III -** Gastro intestinal, Hepatobiliary radiology. Genito urinary, Obstetrics and Gynaecology, Mammography.

**PAPER – IV:** Recent Advances, Pediatric Radiology, Oncologic Radiology, Intervention Radiology and Nuclear Medicine & Radiology Related To Clinical Specialities.

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

**2. Clinical Examination 200 Marks**

40 Spotters	1x40	40marks
4 Cases	40x4	160marks

**3. Viva 100marks**

- |   |         |
|---|---------|
| a. Viva-voice examination                                       | 80marks |
| i. Physics and interventional instruments                       |         |
| ii. PNDT Act and AERB regulations.                              |         |
| iii. Contrast agents,etc  |         |
| b. Pedagogy exercise  | 20marks |
| (Candidate will be asked to make a presentation of 8 to 10 min) |         |

**Total 300marks**

Max Marks	Theory	Practical	Viva	Grand Total
MDRD	400	200	100	700

**Recommended Books and Journals**

**Core books:**

1. Sutton: Text book of Radiology and Imaging volume-I-II.
2. Grainger and Allison’s Diagnostic Radiology: Text book of Medical Imaging
3. Haaga J.R.: Computed Tomography and MRI volume-I and II.
4. Rumack: Diagnostic ultrasound volume I & II
5. K. Subbarao: Textbook of Radiology
6. Christensen’s physics of diagnostic radiology

**Reference books:**

1. Lee: Computed body tomography with MRI volume-I & II
2. Osborn A.G.: Diagnostic neuro-radiology
3. Jacobson’s: Radiology of skeletal disorders
4. Gore Levine: Text book of Gastrointestinal Radiology
5. Margulis: Alimentary tract radiology volume I & II
6. Davidson’s: Radiology of the kidney and Genito-urinary tract
7. Clark: Positioning in radiology
8. Dahnert: Radiology Review Manual
9. Webb: High Resolution CT of the lung
10. Som and Curtin: Head and neck imaging
11. Stark and Bradley: Magnetic resonance imaging Volume I & II
12. Scott W. Atlas: MR imaging of the brain and spine
13. Mittelstaedt CA : General ultrasound
14. Callen: Ultrasonography in obstetrics and gynaecology

**Journals:**

1. Indian Journal of Radiology
2. Radiographics
3. Radiology
4. Radiologic clinics of North America

5. Seminars in U/S, CT and MRI
6. Radiology Journals from Clinical key



# **DIPLOMA IN MEDICAL RADIO DIAGNOSIS (DMRD)**

## **SYLLABUS**

### **Goal:**

Goal of the course is to orient and train the students on different aspects of diagnostic radiology so that the resident is trained in all aspects of the diagnostic radiology and work independently in secondary in tertiary hospitals.

### **Objectives:**

In order to achieve the goal of this course, following objectives are to be accomplished by the time the candidate completes the 2 years course.

Three broad domains of the objectives are:

1. Cognitive domain (Knowledge)
2. Psychomotor domain (Skills)
3. Attitudinal domain (Human values, ethical practice etc.)

### **Cognitive Domain (Knowledge)**

1. Describe aetiology, pathophysiology and principles of diagnosis and management of common problems including emergencies, in adults and children.
2. Demonstrate understanding of basic sciences relevant to this specialty.
3. Identify important determinants in a case (e.g. social, economic, environmental) and take them into account for planning therapeutic measures.
4. Recognize conditions that may be outside the area of specialty/competence and to refer them to proper specialist or ask for help.
5. Advice regarding the management (including interventional radiology) of the case and to carry out the management effectively.
6. Update oneself by self-study and by attending courses, seminars, conferences and workshop which are relevant to the field of radio-Diagnosis.
7. Carry out guided research with the aim of publishing his/her work and presenting work at various scientific fora.

### **Psychomotor Domain (Skills)**

1. Take a proper clinical history, examine the patient, perform essential diagnostic/interventional procedures and interpret the results to come to a reasonable diagnosis or differential diagnosis in the condition.
2. Provide basic life saving support service in emergency situations.
3. Undertake complete patient monitoring including the care of the patient.

### **Attitudinal Domain**

1. Adopt ethical principles in all aspects of his/her practice. Professional honesty and integrity to be fostered.
2. Develop communication skills in order to explain the various options available in management and to obtain a true informed consent from the patient.
3. Be humble and accept the limitations of his knowledge and skills and to

- ask for help from colleagues/ seniors when needed.
4. Respect patient rights and privileges including patient's right to information and right to seek a second opinion.

## **Course Contents**

### **1. BASIC SCIENCES RELATED TO RADIO-DIAGNOSIS**

Radiological anatomy, embryology physiology and pathology.

### **2. RADIOLOGY PHYSICS**

- a) Radiation physics and Radio-Biology
- b) Radiological anatomy and pathology of various organ systems
- c) Imaging Techniques
- d) Radiography

Fundamentals of electromagnetic radiation, X-Ray production, characteristic properties of X-Rays, units of radiation, radiation measurement, X-ray equipments, X-Ray films, intensifying screens, other X-Ray appliances, dark room equipments and procedures, II TV, cinefluorography, tomography.

- Quality assurance.
- Radiation hazards and principle and methods of radiation protection.
- Contrast media: types, chemistry, mechanisms of action, dose schedule, routes of administration, their potential adverse reactions and management.
- Clinical applications of important isotopes and instrumentation in Nuclear medicine with advances in both.
- Physics and applications of advanced imaging i.e., Ultrasound, CT, MRI, Angiography (DSA), PET etc.

### **3. NUCLEAR MEDICINE**

- Interpret common nuclear medicine examinations (including cardiac cases).
- He /she should be able to evaluate the examinations for completion and determine what further images (including non nuclear medicine) need to be done.
- He/she should have a good understanding of the physical and biological properties of the commonly used radiopharmaceuticals, nuclear medicine instruments and safe handling of isotopes and basic radiation safety measures while dealing with isotopes.

### **4. RESPIRATORY SYSTEM**

- Should be able to localize the chest pathology into one of the following compartments: pulmonary, pleural, mediastinal, extra-pleural, extra-thoracic, diaphragmatic, infradiaphragmatic.
- Recognize chest pathology that requires urgent or emergency treatment and describe this in an adequate manner: Pneumothorax, traumatic aortic rupture, esophageal rupture, acute pulmonary embolism, CHF and tracheo-bronchial foreign bodies.
- Recognize acute and chronic patterns of bacterial and viral pneumonia's, occupational diseases, allergic states.
- Recognize acute and chronic cardiac failure patterns and non-cardiogenic edemas.
- Understand the radiographic features and precipitating causes of adult and

- infant respiratory distress syndrome.
- Recognize and describe appropriately the various manifestations of benign and malignant neoplasm's of the lung.

#### 5. **CARDIOVASCULAR RADIOLOGY**

- Understand the anatomy and common pathology of congenital and acquired cardiac conditions.
- Correlate plain film findings of common congenital abnormalities with those shown by angiography and explain the pathophysiology including abnormal pressure measurements.
- Correlate plain film findings and the echocardiographic studies of patients with acquired valvular diseases and other common pathologic conditions including pericardial pathology.
- Understand the role of newer modalities like CT/MRI, in aortic diseases e.g., aorto-arteritis, aortic dissection and aortic aneurysm.
- Should be able to perform fluoroscopy on patients before and after valve replacement and identify those with complications after valve replacement.
- Understand the principle and logic behind various interventional procedures carried out in the cardiovascular labs e.g; PTCA, balloon dilatation of valvular lesions, septostomy etc.

#### 6. **NEURORADIOLOGY.**

- Detailed normal neuro-imaging anatomy on different imaging modalities.
- Identify pathologic conditions (listed under the content) on images acquired using different techniques and communicate the report in a concise manner.
- Participate in daily neuroradiology conferences held with the neurosurgery or neurology units

#### 7. **MUSCULOSKELETAL SYSTEM**

- Communicate precisely and cogently radiographic descriptions of bone and joint trauma.
- Differentiate various forms of arthritis and know correlative laboratory and clinical findings.
- Enumerate the radiographic features that differentiate benign and malignant bone tumors with a basic familiarity of more common tumors.
- Know radiographic features of acute and chronic osteomyelitis and discitis (including tuberculosis).
- Recognize differential features of osteoporosis (including Bone Mineral Density or BMD assessment techniques e.g; US,CT,DEXA) including various endocrine and metabolic diseases e.g; osteomalacia, hyperparathyroidism etc.
- Know the application and interpretation of ultrasound / CT / MRI / angiography in one or more of the above situations.

#### 8. **GASTROINTESTINAL (GIT) AND HEPATO-BILIARY-PANCREATIC SYSTEM**

- Learn to evaluate the clinical condition & needs of a patient and to decide the appropriate studies and approach for examining the GIT or hepato-biliary-pancreatic system of a patient.
- Learn a proper approach to fluoroscopy: this includes developing proficiency-

cy in GIT fluoroscopy, mastering the equipment and using proper radiation protection measures (both for the patient and the operator).

- Learn the basic pathology and patho-physiology of GIT/hepato-biliary-pancreatic diseases.
- Learn to communicate the findings both at fluoroscopy and in films, in an accurate, succinct and meaningful way.

#### 9. **GENITO-URINARY SYSTEM**

- Recognize and evaluate emergency conditions involving the urinary tract including trauma, infection, vascular compromise and obstruction.
- Recognize and understand the patho-physiology of stone disease.
- Recognize patterns of infectious diseases and the modalities necessary for diagnostic evaluation.
- Understand the complete evaluation of renal mass lesions and the evaluation of other urinary tract neoplasms, including the detection and staging of the tumor.
- Recognize the difference between the pattern of diseases affecting the genito-urinary tract of adults and that of children and understand and identify the common conditions affecting the paediatric genito-urinary system on imaging.
- Performing IVU, RGU & MCU.

#### 10. **INTERVENTIONAL RADIOLOGY**

- Basic interventional procedures like image guided biopsy, aspiration and drainage of the fluid collections
- Assist and perform basic angiographic procedures.
- Know the potential risks and complications of procedures performed.
- Present interesting cases in the departmental meets.

#### 11. **PAEDIATRIC RADIOLOGY**

- Understand the appropriate indications for various imaging.
- Know the standard radiographic views for paediatric examinations.
- Learn to recognize and evaluate imaging manifestations (on conventional and newer methods) of common paediatric conditions occurring in the head/neck, chest, abdomen/pelvis and in the musculoskeleton.
- Perform paediatric fluoroscopic examinations with skill and accuracy.
- Understand and apply the knowledge and principle of radiation protection for pediatric patients.

#### 12. **ONCOLOGIC RADIOLOGY**

- Understand pathology and patho-physiology of common neoplasms.
- Learn the algorithmic approach to image these patients based on the suspected disease, its biological behaviour and potential and limitations of various imaging modalities.
- Perform appropriate investigation (both conventional and newer methods), interpret the results and reach at a reasonable diagnosis/ differential diagnosis based on the clinical and biochemical results.
- Learn to communicate the results in a precise way in a written report to the concerned unit.
- Present interesting cases in the departmental meets.

#### 13. **GENERAL RADIOLOGY**

- Learns to direct and perform radiography on patients.

- He/she should be able to decide on further imaging views based on the clinical suspicion and the initial imaging.
- Write reports on the radiographs obtained in a methodical, concise and precise way and communicate it to the referring unit.
- Present interesting cases in the departmental meets

#### 14. **ULTRASOUND**

- Determine or select the appropriate diagnostic procedure for the clinical problem.
- Demonstrate proficiency in patient scanning using appropriate techniques and instrumentation.
- Modify the procedure, if required, based upon the observed abnormalities (pathology).
- Analyze the results of the diagnostic procedure, make diagnosis and record the findings.
- Communicate findings, diagnosis and other relevant information to the referring physician.
- Present interesting ultrasound cases in the departmental conferences/ meetings.

#### 15. **CT**

- The resident will review the daily body CT schedule and based upon the known clinical information and review of other radiologic studies of the same patient done earlier, select the most appropriate CT imaging protocol for the each patient. This may include altering an existing CT protocol to provide the most appropriate examination for an individual patient.
- Develop a working knowledge of the actual performance of the CT examinations. This includes starting intravenous lines, amount and timing of injecting i.v. contrast, and actual operation of CT machine.
- Review and report all the completed body CT examinations. Initially this will be under the supervision of the seniors but later independently – but all reports will be signed by the faculty incharge.
- Participate and present CT cases in departmental and inter departmental meets.

#### 16. **MRI**

- The resident will review the daily quality assurance program of the MRI.
- Review the MRI requests and plan the investigations appropriate to the clinical condition of the patient.
- Develop a working knowledge of the actual performance of the MR examinations. This includes starting intravenous lines, amount and timing of injecting i.v. contrast, and actual operation of MR machine.
- Review and report all the completed body MR examinations. Initially this will be under the supervision of the seniors but later independently – but all reports will be signed by the faculty in-charge.
- Participate and present MR cases in departmental and inter departmental meets.

#### 17. **MAMMOGRAPHY:**

- The resident must know the basics of mammographic principles and its Clinical applications.

#### **Teaching / Learning activities**

A candidate pursuing the course should work in the institution as a full time stu-

dent. No candidate should be permitted to run a clinic / laboratory / nursing home while studying postgraduate course. Each year should be taken as a unit for the purpose of calculating attendance.

Every student shall attend teaching and learning activities during each year as prescribed by the department and not absent himself / herself from work without valid reasons. A list of teaching and learning activities designed to facilitate students acquire essential knowledge and skills outlined is given below.

**1. Lectures:** Lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics. Lectures may be didactic or integrated.

Didactic Lectures: Recommended for selected common topics for post graduate students of all specialities. Few topics are suggested as examples:

- i. Bio-statistics
- ii. Use of library
- iii. Research methods
- iv. Medical code of conduct and medical ethics
- v. National Health and Disease Control Programmes
- vi. Communication skills etc.

These topics may preferably taken up in the first few weeks of the 1<sup>st</sup> year.

Integrated Lectures: These are recommended to be taken by multidisciplinary teams for selected topics, eg. Jaundice, diabetes mellitus, Thyroid, etc.

**2. Journal Club:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the log book relevant details. Further, every candidate must make a presentation from the allotted journal(s), selected articles at least four times a year and a total of 12 seminar presentations in three years. The presentations would be evaluated using check lists and would carry weightage for internal assessment (See checklist in chapter IV). A time table with names of the student and the moderator should be announced at the beginning of every year.

**3. Subject Seminar:** Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the log book relevant details. Further, every candidate must present on selected topics at least four times a year and a total of 12 seminar presentations in three years. The presentations would be evaluated using check lists and would carry weightage for internal assessment (See checklist in chapter IV). A time table for the subject with names of the student and the moderator should be scheduled at the beginning of the year.

**4. Student symposium:** Recommended as an optional multi disciplinary programme. The evaluation may be similar to that described for subject seminar.

**5. Ward rounds:** Ward rounds may be service or teaching rounds.

- a. Service rounds: Postgraduate students and interns should do rounds every day for the care of the patients. Newly admitted patients should be worked up by the PGs and presented to the seniors the following day.
- b. Teaching rounds: Every unit should have 'grand rounds' for teaching purpose. A diary should be maintained for day to day activities by the students.
- c. A minimum of 40 clinical cases must be seen every year.
- d. Entries of (a), (b) and (c) should be made in the log book.

**6. Clinico – pathological conference:** Recommended at least once in three months for all post graduate students. Presentation shall be done by rotation.

If cases are not available due to lack of clinical postmortems, it could be supplemented by published CPCs.

- 7. Inter departmental meetings:** Strongly recommended particularly with departments of Pathology and Radio – diagnosis at least once a week. These meetings should be attended by post graduate students and relevant entries must be made in the log book.
  - Pathology: A dozen interesting cases may be chosen and presented by the post graduate students and discussed by them as well as the senior staff of the department. The staff of Pathology department would then show the slides and present final diagnosis. In these sessions the advanced immuno-histo-chemical techniques, the burgeoning markers & other recent development can be discussed.
  - Radio–diagnosis: Interesting cases and the imaging modalities should be discussed.
- 8. Teaching Skills:** Post graduate students must teach under graduate students (eg. medical, nursing) by taking demonstrations, bed side clinics, tutorials, lectures etc. Assessment is made using a checklist by surgery faculty as well students. (See model checklist in Chapter IV). Record of their participation shall be kept in log book. Training of post graduate students in educational science and technology is recommended.
- 9. Continuing medical education programmes (CME):** Recommended that at least 2 state level CME programmes should be attended by each student in 3 years.
- 10. Conferences:** Attending conferences is optional. However it is encouraged.

### **Monitoring Learning Progress**

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only also helps teachers to evaluate students, but also students to evaluate themselves. The monitoring shall be 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:

1. Personal attitudes
2. Acquisition of knowledge
3. Clinical and operative skills
4. Teaching skills
5. Dissertation

#### **1. Personal Attitudes:** The essential items are:

- Caring attitude
  - Initiative
  - Organizational ability
  - Potential to cope with stressful situations and undertake responsibility
  - Trust worthiness and reliability
  - To understand and communicate intelligibly with patients and others
  - To behave in a manner which establishes professional relationships with patients and colleagues
  - Ability to work in a 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.

**2. 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.

- a) **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 (see Model Checklist – I, Chapter IV)
- b) **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)
- c) **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 presentation(s) are to be assessed using a checklist similar to that used for seminar.
- d) **Medical Audit:** Periodic morbidity and mortality meeting be held. Attendance and participation in these must be insisted upon. This may not be included in assessment.

### **3. Clinical Skills:**

- a) **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)
- b) **Clinical Meeting:** Candidates should periodically present cases to his peers and faculty members. This should be assessed using a checklist (see Model Checklist IV, Chapter IV)
- c) **Clinical and Procedural 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)

**4. 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. (See Model Checklist V, Chapter IV)

**5. Periodic tests:** The department 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, practical / clinical and viva voce.

**6. 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.



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

### **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 counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommended 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:**

**1. Theory:** There shall be three question papers, each of three hours duration. Each paper shall consist of two long essay questions each questions 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 sciences related to Radiology- Radiological Anatomy, Physiology, pathology , Radiology physics including basics of Ultrasound, CT,MRI, Radiation protection, Nuclear Medicine, Planning a Radiology Dept. PC-PNDT Act.

**Paper - II -** Respiratory system, cardiovascular system, Neuroradiology including Head and Neck, Musculoskeletal, Mammography

**Paper -III -** Gastrointestinal & Hepato-Biliary System, Genito-Urinary System, Obstetric imaging, Interventional Radiology, Paediatric Radiology, Oncologic Radiology

**Note: The distribution of chapter/topics shown against the papers are suggestive only**

### **Clinical Examination**

**150 Marks**

30 Spotters	1x30	- 30marks
4 Cases	30x4	- 120marks

### **2. Viva**

**50 marks**

- i. Physics and interventional instruments
- ii. PNDT Act and AERB regulations.
- iii. Contrast agents,etc

**Total 200 marks**

<b>Max Marks</b>	<b>Theory</b>	<b>Practical</b>	<b>Viva</b>	<b>Grand Total</b>
DMRD	300	150	50	500

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- 14.Callen: Ultrasonography in obstetrics and gynaecology

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3. Radiology
4. Radiologic clinics of North America
5. Seminars in U/S, CT and MRI
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