



YENEPOYA UNIVERSITY

Deralakatte, Mangalore - 575018

**REGULATIONS AND CURRICULUM GOVERNING
POSTGRADUATE PROGRAM (MD) IN
RADIO DIAGNOSIS**

(CURRICULUM - EFFECTIVE FROM 2010-11)

ATTESTED
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Ref: No.YU/REG/ACA/5-ACM/2010

15.10.2010

NOTIFICATION

Sub: Curriculum and Syllabus governing the Postgraduate course in the
Speciality of MD, Radio Diagnosis

Ref: Resolution of the Academic Council at its 5th Academic Council
meeting held on 11.10.2010, vide agenda - 8

The Academic Council at its 5th meeting held on 11.10.2010 and subsequently the 12th
Board of Management at its meeting held on 12.10.2010 have resolved to approve the
curriculum and syllabus governing the Postgraduate course in the speciality of MD,
Radio Diagnosis.

This notification is issued for implementation with effect from the academic year 2010-
2011.



REGISTRAR

To:

The Principal - YMC

Copy to:

1. Controller of Examinations
2. Academic Section

Goal

The goal of the course is to orient the students on various aspects of imageology by way of theory and practical training in the diseases of various systems of the human body. They should be able to apply knowledge and skills at secondary and tertiary level of medical care.

The postgraduate training course would be to train a MBBS doctor who will:

- Exercise empathy and caring attitude and maintain high ethical standards.
- Continue to evince keen interest in continuity education in the specialty irrespective of whether he is in a teaching institution or is a practicing specialist.
- Be a motivated 'teacher' – defined as a specialist keen to share his knowledge and skills with a colleague or a junior or any learner.

Objectives

The following objectives are laid out to achieve the goals of the course. These objectives are to be achieved by the time the candidate completes the course. The objectives may be considered under the subheadings.

1. Knowledge (cognitive domain)
2. Skills (Psycho motor domain)
3. Human values, ethical practice and communication abilities.

Knowledge

- Describe a etiology, pathophysiology, principles of diagnosis and management of common problems including emergencies, in adults and children.
 - Describe indications and methods for fluid and electrolyte replacement therapy including blood transfusion.
 - Describe common malignancies in the country and their management including prevention.
 - Demonstrate understanding of basic sciences relevant to this speciality.
 - Identify social, economic, environmental and emotional determinants in a given case and consider them for planning therapeutic measures.
 - Recognize conditions that may be outside the area of his specialty / competence and to refer them to the proper specialist.
 - Advice regarding the operative of non-operative management of the case and to carry out this management effectively.
 - Update oneself by self study and by attending courses, conferences and seminars relevant to the specialty.
 - Teach and guide his team, colleagues and other students.
 - Undertake audit, use information technology tools and carry out research, both basic and clinical, with the aim of publishing his work and presenting his work at various scientific for a.
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Skills

- Take a proper clinical history, examine the patient, perform essential diagnostic procedures and order relevant tests and interpret them to come to a reasonable diagnosis about the condition.
- Provide basic and advanced life saving support services (BLS & ALS) in emergency situations.

Human values, Ethical practice and Communication abilities

- Adopt ethical principles in all aspects of his/ her practice. Professional honesty and integrity are to be fostered. Care is to be delivered irrespective of the social status, caste, creed or religion of the patient.
- Develop communication skills, in particular the skill to explain various options available in management and to obtain a true informed consent from the patient.
- Provide leadership and get the best out of his team in a congenial working atmosphere.
- Apply high moral and ethical standards while carrying out human or animal research.
- Be humble and accept the limitations in his knowledge and skill and to ask for help from colleagues when needed.
- Respect patient's rights and privileges including patient's right to information and right to seek a second opinion.

Course Contents

1. Basic sciences (Radiation Physics and Radio- Biology) , Newer imaging techniques , Radiological Anatomy, Physiology, Pathology and Radiography

Includes fundamentals in Electricity and Electro magnetic induction, Ammeter, Voltmeter and Galvanometer. Transformers, Rectifiers, Rectification, Timers, X-ray Production and other aspects of x- rays. Electro magnetic Radiation, Units of Radiation interaction x-ray film intensifying screens and other x-ray appliances, Dark room procedures etc. II TV and cline flurography , Tomography Radiative isotopes and uses, instrumentation in Nuclear Medicine, MMR, Radiation production and other aspects of production.

Radiological Anatomy, Physiology and pathology of different system of the body and Radiographic Techniques concerned to each system.

Physics of Ultrasound CT, MRI.

Basics of Radiotherapy and equipments of Radiotherapy.

2. Respiratory system

Includes the following methods of investigations and interpretation of Chest films, Chest wall, Diaphragm, Pleural disease and air way disease, Pulmonary

vasculature, pulmonary infections, pulmonary neoplasm, diffuse lung disease, Mediastinal disease, Chest Trauma, Post operative lung and intensive care.

3. Alimentary and Hepatobiliary system : Congenital Anomalies of GI Tract

Disease and disorders of mouth , Pharynx, Esophagus, stomach small intestine, large intestine , disease of omentum and mesentery, acute abdomen, abdominal trauma, Newer methods like isotopes study, MDCT and MRI. Hepatobiliary system disease and disorders, newer methods of imaging hepatobiliary pancreatic system like Isotopes study, MDCT, MRI.

4. Head and Neck : spinal column and skull

Includes Radiological dimension and imaging of various diseases and disorders of the above system. Investigative procedures of congenital lesions, vascular lesions, infective lesions, Metabolic lesions, traumatic lesions and neoplasia of the central nervous system including CT, MRI.

Disease and disorders of spinal cord lesions including congenital lesions. Interventional procedures.

5. Cardiovascular system

Role of Radiological imaging by different Techniques including DSA and interventional procedures.

Disease and disorders of Cardiovascular system including congenital conditions and the role of imaging by conventional, Ultrasound, Echo, Doppler, CT, MRI, Angio, DSA and Radio Nuclide studies.

6. Endocrinal system

Imaging of disorders, disease and congenital conditions of endocrinal glands- Pituitary, Adrenal, Thyroid , para thyroid, pancreas.

Newer methods of imaging including embolisation.

7. Genito Urinary system

Imaging- conventional (IVU, MCU, ASU) , Ultrasound , CT, MRI of various disease and disorders including congenital conditions of genitor Urinary system.

Role of interventional imaging

8. Musculo Skeletal system

Role of conventional, Ultrasound, Radio Nuclide studies, CT, MRI of disease and disorders and congenital conditions of muscles, soft tissue , bones and joints.

9. Soft tissue Radiology

Includes various soft tissue disorders and diseases and role of imaging.

10. Interventional Radiology

Includes all procedures like interventional imaging and interventional treatment.

Recent trends and Advances

Includes all information and imaging information that published in National and International Journals and references, vascular ultrasound, PACS, digital x-ray, CT, MRI and Nuclear Medicine.

Teaching and 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 post graduate 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 outlines 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 postgraduate students of all specialties. Few topics are suggested as examples :
 1. Bio-statistics.
 2. Use of library
 3. Research Methods
 4. Medical code of conduct and Medical Ethics
 5. National health and disease control programs
 6. Communication skills etc.
 7. Initial introductory lectures about the subject.

These topics may preferable taken up in the first few weeks of the 1st year.

- B) Integrated Lectures: These are recommended to be taken by multidisciplinary teams for selected topics e.g. Jaundice, Diabetes Mellitus, and 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 logbook relevant details.
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Further, every candidate must make a presentation from the allotted journal(s) of selected articles at least four times a year and 12 presentations in three years. The presentations would be evaluated using checklists and would carry weightage internal assessment (see Checklist in Chapter IV). A timetable with names of the students 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 logbook 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 checklists and would carry weightage for internal assessment (see Checklist in Chapter IV). A timetable for the subject with names of the student and the moderator should be scheduled at the beginning of every year.
4. **Student Symposium**: Recommended as an optional multi disciplinary programme. The evaluation may be similar to that described for the subject seminar.
5. **Mortality & Morbidity Meetings**: Recommended once a month for all postgraduate students. Presentation be done by rotation and by the students who had conducted/ assisted anaesthetic management.
6. **Inter Departmental Meetings**: Strongly recommended particularly with departments of Surgery, Orthopedics, Paediatrics, OBG and Medicine at least once a month. These meeting should be attended by post graduates students and relevant entries must be made in Logbook.
7. **Teaching skills**: Postgraduates students must teach Undergraduate students (e.g Medical Nursing) by taking demonstrations, bedside clinics, tutorials, lectures etc. Assessment is made using a checklist by faculty. Record of their participation should be kept in Logbook. Training of postgraduate students in Educational Technology is recommended.
8. **Continuity Medical Education Programmes (CME)**: At least two state and national level CME programmes should be attended by each student in 3 years.
9. **Conferences**: Attending conferences is optional. However, participation & presentation of scientific paper should be encouraged.

Rotation Posting

Three months duration

1. NIMHANS for exposure and interpretation of Brain and spinal cord lesions- 2 weeks
2. For cancer radio-diagnosis and Nuclear Medicine in an oncology - 2 weeks
Department or institute -----
4 weeks

Dissertation

1. Every candidate pursuing MD/ MS degree course is required to carry out work on a selected research project under the guidance of a recognized 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, being acquainted with recent advances, designing of a research study, collection of data, critical analysis, and comparison of results and drawing conclusions.
 3. Every candidate shall submit to the Registrar (Academic) of the University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work six months from the date of commencement of the course on or before the dates notified by the university. The synopsis shall be sent through proper channel.
 4. Such synopsis will be reviewed and the dissertation topic will be registered by the University. No change in the dissertation topic or guide shall be made without prior approval of the University.
 5. The dissertation should be written under the following headings :
 - i. Introduction
 - ii. Aims of Objectives of study
 - iii. Review of Literature
 - iv. Material and Methods
 - v. Results
 - vi. Discussion
 - vii. Conclusion
 - viii. Summary
 - ix. References (Vancouver style)
 - x. Tables
 - xi. Annexures
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6. 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 of paper (A4size, 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.

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

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

9. 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 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 included: (i) Personal Attitudes (ii) Acquisition of Knowledge, (iii) Clinical and operative skills, (iv) Teaching skills and (v) Dissertation.

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

- Caring attitudes
 - Initiative
 - Organization 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 established professional relationships with patients and colleagues
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- Ability to work in team
 - A critical enquiring approach to the acquisition of knowledge

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

- ii) *Acquisition of Knowledge:* The methods used comprise of 'Log Book' which records participation in various teaching/learning activities by the students. The number of activities attended and the number in which presentation 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, is 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 presenter(s) are to be assessed using a check list 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.

- iii) *Clinical Skills:* Day to day work: Skills in outpatient and ward work should be assessed periodically. The assessment should include the candidates' security and punctuality, analytical ability and communication skills (see Model Checklist III, Chapter IV).

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- Clinical meetings: Candidates should periodically present cases to his peers and faculty members. This should be assessed using a check list (see Model Checklist Iv, Chapter IV)
- Clinical and 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 logbook. (Table No. 3, chapter IV).
- iv) Teaching Skills : Candidates should be encouraged by 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).
 - v) Dissertation in the Department: Periodic presentation are to be made in the department. Initially the topic selected is to be presented before submission to the University for registration, again before finalization for critical evaluation and another before final submission of the completed work (See Model checklist VI&VII, Chapter IV).
 - vi) Periodic tests: The departments may conduct three tests, two of them be annual tests, one at the end of first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practicals/clinical and viva voce.
 - vii) Work diary/Log book –Every candidate shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal reviews, seminars, etc. special mention maybe made of the presentations by the candidate as well as details of clinical or laboratory procedure, if any conducted by the candidate.
 - viii) Records: records, log books and marks obtained in tests will maintained by the Head of the Department and will be made available to the 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 Log Book for the different activities is given in Table 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 recommend that defaulting candidate be withheld from appearing the examination, if she/he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

Scheme of Examination

i) Theory

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

Paper –I

- 1) Basic sciences as applied to Radio-Diagnosis –Radiological Anatomy, Physiology, Pathology, Radiography, Radiation Physics and Biology.
Basics of Ultrasound CT, Nuclear Medicine and MRI.
- 2) Bones and Joints

Paper –II

Respiratory system: Gastrointestinal system and abdomen (including Pancreas, Adrenals, Biliary tree, spleen, Liver and acute abdomen).

Paper – III

Cardiovascular system including Lymphatic system, Arteriography Phlebography and interventional procedures.

Urogenital system including Scrotum and Obstetrics and Gynaecology.

Paper – IV

Skull and Central Nervous system: ENT, Eyes, Teeth and Soft tissues.

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

ii. Clinical

200 marks

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- a) Long Case – One – 100 Marks
 - b) Short Cases – two – 100 Marks (50 X 2)

iii. Viva – Voce **100 marks**

1. Viva – Voce Examination (80 marks)

All examiners will conduct viva – voce conjointly on candidates comprehension, analytical approach, expression and interpretation of data. It includes all components of course contents spotters of conventional & newer imaging techniques and instruments. In addition, candidates may be also be given case reports, charts, gross specimens, etc., for interpretation. It includes discussion on dissertation also.

2. Pedagogy Exercise (20 marks)

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

iv)

Maximum marks for	Theory	Practical	Viva	Grand Total
MD Radio-Diagnosis	400	200	100	700

Recommended Textbooks:

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| 1. Text Book of Radiology and Imaging | - By Sutton |
| 2. Text Book of Diagnostic Radiology | - Grainger |
| 3. Text books of x-ray Diagnosis | - Shanks & Kerley |
| 4. Positioning in Radiography | - Clark |
| 5. Diagnostic Radiology & Imaging | - K. SubbaRao |
| 6. Fundamental Physics of Radiology | - Meredith |
| 7. Radiographic Anatomy | - Meschan |
| 8. Diagnostic Ultrasound | - Sarti |
| 9. Basic Nuclear Medicine | - Sheldon Baur |
| 10. Alimentary Tract and Imaging | - Margullis |
| 11. Essentials of Radiological imaging | - Paul & Juhls |

Reference Books

1. Diagnostic Radiology C T & MRI of whole body - By Haaga
2. Pediatric x-ray diagnostic - Caffey's
3. Roentgen's Science in Diagnostic imaging - Meschan
4. Seminar in Ultrasound
5. Felsons chest Radiology - Felson
6. Aids to differential diagnostic - Chapman
7. Text book of Neuro imaging - Osborn
8. Uro Radiology - Elkin
9. Diagnostic Ultrasound - Cannon
10. Diagnostic Ultrasound - Cosgroove
11. Diagnostic Ultrasound - UMAC
12. Echo - Phegonbom
13. H.R.C.T.

Journals

1. Indian Journal of Radiology and Imaging
2. Clinical Radiology
3. British Journal of Radiology
4. Americal Journal of Roentegenology
5. Radiology clinics in North America
6. Recent Advances in Radiology and Imaging
7. Lancet
8. Journal of Diagnostic Medical Sonography
9. Seminar in Ultrasound
10. Clinical Nuclear Medicine
11. Journal of Vascular and Interventional Radiology
12. Journal of Computed assisted Tomography