

Syllabus for MD (Radio-diagnosis) Programme



Atal Medical & Research University

A state University established by the Govt of H.P



Atal Medical & Research University, H.P.

(A State Govt. University)

(SLBS Govt. Medical College & Hospital Campus, Ner Chowk, Mandi, H.P.)

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Minutes of meeting of PG Board of Studies (Radiology) held on 15th September, 2023 in COE Office, AMRU, at 11:00 AM

A meeting of Post Graduate Board of Studies (Radiology) was held on 15th September, 2023 at 11:00 AM in COE Office, AMRU under the Chairmanship of Dr. Anupam Jhobta, Professor & HOD, Deptt. of Radiology, IGMC, Shimla, HP

Following members attended the meeting:


1. Dr. Anupam Jhobta, Professor & HOD, Deptt. of Radiology, IGMC, Shimla -cum-Chairperson.
2. Dr. Ravinder Kaur, (Outside Expert), Professor & HOD Deptt. of Radio-diagnosis, Govt. Medical College & Hospital, Sec 32 Chandigarh nominated by the Hon'ble Vice Chancellor - cum-Member (through video conference)
3. Dr. Ashwani Kumar Tomar, Professor & HOD, Deptt. Of Radiology, IGMC Shimla-cum-Member
4. Dr. Rohit Bhoil, Assistant Professor, Dept. of Radiology, IGMC, Shimla -cum-Member.

The meeting started with the Chairperson welcoming the members.

The following decisions were taken:

1. Syllabus for degree of MD Radiology prescribed by NMC was discussed among the members, few suggestions of members were added and final draft was approved.
2. Examination pattern of MD Radiology prescribed by NMC was discussed and accepted with few additions.
3. The teaching schedule to be followed by the PG department has been reviewed.
4. The evaluation of the thesis was also discussed and finalized.
5. Logbook was discussed & finalized.


The meeting ended with a vote of thanks to the chair.


(Dr. Anupam Jhobta)
Professor & HOD, Deptt. of
Radiology, IGMC, Shimla

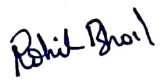
(Chairperson)

(Dr. Ravinder Kaur)
(Outside Expert), Professor & HOD Deptt.
of Radio-diagnosis, Govt. Medical College
& Hospital, Sec 32 Chandigarh nominated
by the Hon'ble Vice Chancellor

(Member)


(Dr. Ashwani Kumar Tomar)
Professor & HOD, Deptt. Of
Radiology,
IGMC, Shimla

(Member)


(Dr. Rohit Bhoil)
Asstt. Professor., Dept. Of
Radiology,
IGMC, Shimla

(Member)

SYLLABUS FOR MD RADIO-DIAGNOSIS

Atal Medical & Research University. H.P.

SUBJECT SPECIFIC COMPETENCIES

A. Cognitive Domain

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

1. Acquire good basic knowledge in the various sub-specialties of radiology such as chest radiology, neuro-radiology, GI-radiology, uro-radiology, cardio-vascular-radiology, musculoskeletal, interventional radiology, emergency radiology, pediatric radiology and women's imaging.
2. Independently conduct and interpret all routine and special radiologic and imaging investigations.
3. Provide radiological services in acute emergency and trauma including its medico-legal aspects.
4. Elicit indications, diagnostic features and limitation of applications of ultrasonography, CT and MRI and should be able to describe proper cost-effective algorithm of various imaging techniques in a given problem setting.
5. Decide on the various image-guided interventional procedures to be done for diagnosis and therapeutic management.
6. Able to decide on further specialization to be undertaken in any of the branches in Radiodiagnosis such as gastrointestinal radiology, uro-radiology, neuro-radiology, vascular radiology, musculoskeletal radiology, interventional radiology etc.
7. Able to formulate basic research protocols and carry out research in the field of radiology-related clinical problems.
8. Acquire knowledge and teaching capabilities to work as a post graduate student in Radiodiagnosis and conduct teaching programmes for undergraduates, post graduates as well as paramedical and technical personnel.
9. Interact with other specialists and super-specialists so that maximum benefit accrues

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to the patient.

10. Should be able to organize CME activities in the specialty utilizing modern methods of teaching and evaluation.
11. Acquire knowledge to impart training in both conventional radiology and modern imaging techniques so that the post graduate student is fully competent to practice, teach and do research in the broad discipline of radiology including ultrasound, Computed Tomography and Magnetic Resonance Imaging.
12. Acquire knowledge of interventional radiology.

B. Affective Domain:

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

C. Psychomotor domain

Practical Training will include two major aspects:

- I. Interpretation of images, and
- II. Skill in performing a procedure.

I. Interpretation of images:

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

Rohit Shrivastava

Dr. P. S. Rao

Dr. P. S. Rao

1. **Musculo-skeletal System** - Interpretation of diseases of muscles, soft tissue, bones and joints including congenital, inflammatory, traumatic, endocrine and metabolic, neoplastic and miscellaneous conditions.
2. **Respiratory System** - Interpretation of diseases of the chest wall, diaphragm, pleura and airway; pulmonary infections, pulmonary vasculature; pulmonary neoplasm; diffuse lung disease; mediastinal disease, chest trauma; post-operative lung and X-ray in intensive care.
3. **Cardiovascular System** - Interpretation of diseases and disorders of cardiovascular system (congenital and acquired conditions) and the role of imaging by conventional radiology, ultrasound, colour Doppler, CT, MRI, Angiography and Isotopes Studies.
4. **Gastro-intestinal tract and hepato-biliary pancreatic system** - Interpretation of diseases and disorders of mouth, pharynx, salivary glands, esophagus, stomach, small intestine, large intestine, diseases of omentum, peritoneum and mesentery: acute abdomen, abdominal trauma. Diseases and disorders of liver, biliary system and pancreas.
5. **Urogenital System** - Interpretation of various diseases and disorders of genitor-urinary system. These include: congenital, inflammatory, traumatic, neoplastic, calculus disease and miscellaneous conditions.
6. **Central Nervous System (C.N.S.)** - Interpretation of diseases and disorders of the head, neck and spine covering, congenital, infective, vascular, traumatic neoplastic degeneration metabolic and miscellaneous condition.
7. Imaging in Emergency Medicine.
8. Imaging in Obstetrics and Gynecology.
9. Imaging of Breast and interventional procedures.
10. ENT, EYE and Dental Imaging.
11. Imaging of endocrine glands and those involved with metabolic diseases.
12. Clinical applied radionuclide imaging.
13. Interventional Radiology

II. Skills in performing a procedure

The student should be able to perform the following procedures:

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Dr. J. S. Singh

Dr. Anup

- 1) **GIT contrast studies:** Barium studies (swallow, upper GI, Follow through, enema);
fistulogram; sialogram; cologram/ileostogram,
- 2) **GU:** Excretory urography, MCU, RGU, nephrostogram, genitogram,
- 3) **Ultrasound:** Studies of whole body including neonatal trans fontanell studies, Doppler studies,
- 4) **CT scan:** should be able to position a patient, plan study as per the clinical indication, do reconstruction of images, perform triple phase study, perform & interpret advanced applications like CT enterography, CT angiography etc.
- 5) **MRI:** plan and perform MRI studies of whole body
- 6) **DSA:** should be able to describe the techniques, do (if available to student) transfemoral puncture and insert catheter, help in angiographic procedures both diagnostic and interventional.
- 7) **Radiography:** should be able to independently do radiography of common and some important uncommon views of different body parts. This includes positioning, centering of X ray beam, setting of exposure parameters, exposing and developing the films. The student should be familiar with not only conventional radiography but with CR and DR systems.
- 8) **Interventional radiology:** The student should be able to perform simple, common non- vascular procedures under ultrasound and fluoroscopy guidance e.g. abscess drainage, drainage catheter placement, nephrostomy, biliary drainage etc. The student should have knowledge of common vascular interventions e.g stricture dilatation using balloon catheters, embolization with gel foam and other agents, names of common catheters, handling of intravenous contrast reactions; techniques, indications and contraindications for various procedures;

Rohit Bhoi

AD/ms

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SYLLABUS

Course contents: Anatomy

Gross and cross sectional anatomy of all the body systems.

Pathology

Gross morphology of pathological conditions of systemic diseases affecting all organsystems.

Radiology Course

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

- Chest
- Cardiovascular system
- Musculoskeletal including soft tissue
- Gastrointestinal system
- Hepato-biliary-pancreatic system
- Urogenital (genito-urinary) system
- CNS including head and neck
- Obstetrics and gynaecology
- ENT, eye, dental, breast
- Endocrine and metabolic system
- Clinically applied radionuclide imaging

Radiological Physics

1. Introduction of general properties of radiation and matter: Fundamentals of nuclear physics and radioactivity
2. Interaction of x-rays and gamma rays with matter and their effects on irradiated materials
3. X-ray Generating Apparatus
4. Screen-film radiography
5. Film processing: Dark room, dry processing, laser /dry chemistry cameras, artifacts.
6. Fluoroscopy: Digital including flat panel units, fluoroscopy cum radiography units

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Dr. J. S. Jais

Dr. J. S. Jais

7. Digital radiography: Computed Radiography, Flat panel radiography
8. Other equipments: Ultrasound including Doppler, CT, MRI and DSA
9. Contrast Media (Iodinated, MR & Ultrasound) - types, chemical composition, mechanism of action, dose schedule, route of administration, adverse reaction and their management
10. Nuclear Medicine: Equipments and isotopes in various organ systems and recent advances
11. Picture Archiving and Communication System (PACS) and Radiology Information System (RIS) to make a film-less department and for Teleradiology
12. Radiation protection, dosimetry and radiation biology
13. Image quality and Quality Assurance (QA)
14. Recent advances in radiology and imaging

The student should have knowledge of the following physics experiments:

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

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Radiography and processing techniques

1. Processing techniques: includes dark room and dry processing.
2. Radiography of the musculo-skeletal system including extremities.
3. Radiography of the chest, spine, abdomen and pelvic girdle.
4. Radiography of the skull, orbit, sinuses.
5. Contrast techniques and interpretation of GI tract, hepato-biliary tract, pancreas
6. Contrast techniques and interpretation of the Central Nervous system.
7. Contrast techniques and interpretation of the cardiovascular system including chest.
8. Contrast techniques and interpretation of the genito - urinary system including Obstetrics and Gynaecology.
9. Paediatric radiology including MCU, genitogram, bone age.
10. Dental, portable and emergency (casualty) radiography.

TEACHING AND LEARNING METHODS

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

1. Physics related to imaging
2. Rotational posting in various sub-specialties.
3. Seminars, case discussion, journal club.
4. Research methodology and statistics.
5. A log book should be maintained by the student and will be checked and signed regularly by the faculty-in-charge during the training program.
6. The postgraduate students shall be required to participate in the teaching and training program of undergraduate students and interns.
7. The postgraduate student would be required to present one poster presentation, to read one paper at a national/state conference and to submit one research paper which should be published or accepted for publication or sent for publication to a peer reviewed journal, during the period of his/her postgraduate studies so as to make

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him/her eligible to appear at the postgraduate degree examination.

8. Department should encourage e-learning activities.

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DR ASHWANI TOMAR
Professor
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DR ANUPAM THAKUR
Prof & HOD
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EXAMINATION PATTERN FOR MD RADIODIAGNOSIS

The Post Graduate Examination shall be conducted in three parts.

The examinations shall be organized on the basis of 'Grading' or 'Marking system' to evaluate and to certify post graduate student's level of knowledge, skill and competence at the end of the training. Obtaining a minimum of 40% marks in each theory paper and not less than 50% cumulatively in all the four papers for degree examinations. Obtaining of 50% marks in Practical examination shall be mandatory for passing the examination as a whole in the said degree examination.

A. Theory Examination

There shall be four theory papers (Total marks -100X4 = 400)

Paper I: Basic sciences related to Radiology (consists of Anatomy, Pathology, Basic and Radiation Physics, Imaging Techniques, and Film processing).

Paper II: Chest, CVS, CNS including Head & Neck, Eye, ENT, musculo-skeletal, pediatric radiology and Mammography.

Paper III: Abdominal Imaging including GI, GU, Hepatobiliary, endocrine and metabolic, Obstetrics and Gynaecology and Interventional radiology

Paper IV: Recent advances, nuclear medicine; Radiology related to clinical specialties

All papers would consist of short answer questions (minimum 10) covering all aspects of the course. Each paper shall be of 100 marks.

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B. Practical Examination**(Total 400 marks)**

Practical Examination will have:

- i. One Long case (100 marks) and two short cases (50+50 marks)
- ii. Film Quiz - 50 spots (100 marks)
- iii. To perform Ultrasound on a patient (20 marks)
- iv. Oral/Viva voce (40 marks)
- v. Internal assessment (40 marks)

Internal Assessment should be frequent, cover all domains of learning and used to provide feedback to improve learning; it should also cover professionalism and communication skills.

- **FORMATIVE ASSESSMENT**, during the training programme should be continual and should assess medical knowledge, patient care, procedural & academic skills, interpersonal skills, professionalism, self directed learning and ability to practice in the system.
- **QUARTERLY ASSESSMENT** during the MD training should be based on:
 1. Journal based / recent advances learning
 2. Patient based /Laboratory or Skill based learning
 3. Self directed learning and teaching
 4. Departmental and interdepartmental learning activity
 5. External and Outreach Activities / CMEs

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The student to be assessed periodically as per appraisal form (Annexure I).

- **SUMMATIVE ASSESSMENT**, i.e., assessment at the end of training period.

C. Thesis:

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

Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination.

The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical examinations.

The internal thesis examiner shall not be the guide /co-guide of the thesis (es) being evaluated; and on the acceptance of the thesis by two examiners, the candidate shall appear for the final examination.

Rohit Bhal

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POST GRADUATE EXAMINATION
GUIDELINES ON APPOINTMENT OF POST GRADUATE
EXAMINERS

- 1) No person shall be appointed as an examiner in the subject of Radio-diagnosis unless he fulfills the minimum requirements for recognition as a Post Graduate teacher as laid down by the Medical Council of India and is having a total of eight years' teaching experience out of which at least five years teaching experience as Lecturer or Asst. Professor.
- 2) For internal examiner, he/she should have minimum three years experience as recognized PG teacher in the subject of Radiodaagnosis. For external examiners, he/she should have minimum six years of experience as recognized PG teacher in the concerned subject. Out of internal examiners, one examiner shall be a professor and Head of Department or Head of Department.
- 3) There shall be at least four examiners in an examination out of which at least 50% (Fifty percent) shall be external examiners. The external examiner who fulfils the condition laid down in clause – 1 above shall ordinarily be invited from another recognised university, from outside the State: provided that in exceptional circumstances examinations may be held with 3 (three) examiners if two of them are external and Medical council of India is intimated with the justification of such examination and the result shall be published in such a case with the approval of Medical council of India.
- 4) An external examiner may be ordinarily been appointed for not more than two years consecutively. Thereafter he may be reappointed after an interval of two years.

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AD/Manager

Amr

- 5) The same set of examiners shall ordinarily be responsible for the written, practical part of examination.
- 6) Where there is more than one centre of examination, there shall be Coordinator/Convenor/Chairman who shall be the Seniormost internal Examiner, appointed by the University and shall supervise and Coordinate the examination on behalf of the University with independent authority.



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Annexure 1

Postgraduate Students Appraisal FormPre / Para /Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

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

Sr. No.	PARTICULARS	Not Satisfactor y	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmenta l learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications

Yes/ No

Remarks*-----

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

SIGNATURE OF ASSESSEE

SIGNATURE OF CONSULTANT

SIGNATUREOF HOD

Robert Robert

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