



# अखिल भारतीय आयुर्विज्ञान संस्थान, नागपुर

All India Institute of Medical Sciences, Nagpur

राष्ट्रीयमहत्वकाएकसंस्थान / An institute of National Importance

क्ष किरणशास्त्र विभाग/ Department of Radiology

## PG CURRICULUM FOR MD RADIODIAGNOSIS

## **PREAMBLE**

The main aim of this course is to introduce and orient the students about various facets of clinical radiology which includes diagnostic as well as interventional radiology. During three years, the students will not only be trained in conventional and modern radiology imaging techniques & interventions but also in the implication of them in clinical practice and research. Apart from this, the students should be well acquainted with medical ethics and preconception & prenatal diagnostic technique act (PCPNDT act).

## **OBJECTIVE**

A student on completing his/her MD (Radio-diagnosis) should be able to-

1. Acquire basic knowledge in the various sub-specialties of radiology which includes neuro-radiology including head and neck imaging, dental radiology, chest radiology, breast imaging, gastrointestinal radiology, uro-radiology, musculoskeletal radiology, vascular radiology, paediatric radiology, interventional radiology and emergency radiology.
2. Extract clinical history from patient, examine the patient and independently perform necessary diagnostic/special procedures and interpret the results.
3. Perform (under supervision) various image guided interventional procedures for diagnosis and therapeutic management.
4. Provide radiological services in emergency situations and trauma including the medico legal cases.
5. Provide basic life-saving support service in emergency situations.
6. Elicit indications, diagnostic features and limitation of application of ultrasonography (USG), Computed tomography (CT) and Magnetic Resonance Imaging (MRI) and should be able to justify appropriate algorithm for different imaging techniques in given condition to yield satisfactory results.
7. Actively interact with other specialists so as to extract maximum cost-effective management to the patient.
8. Manage contrast media reactions occurring in radiological procedures and strictly follow radiation protection measures.
9. Update oneself by interacting with faculties, co-residents and by attending various CMEs, seminars, education programs, conferences and workshop.

10. Learn basic research protocols and take on research projects with intension of publishing and presenting work at various scientific platforms.
11. Undertake further specialization in various branches in Radiology viz. Neuroradiology, Gastrointestinal radiology, Uroradiology, Vascular radiology, Musculoskeletal radiology, Interventional radiology etc.
12. Adopt and follow the ethical principles during the practice and maintain the professional honesty and integrity throughout.
13. Develop good communication skills so as to obtain an informed consent for the procedure after explaining about various options available in disease diagnosis and management.
14. Respect the patient privileges which include the right to information and right to seek a second opinion.
15. Accept the limitations of his/her knowledge, skills and ready to ask for help from colleagues/ seniors when needed.

The training period is of 3 years which includes -

1. Theory Lectures in Radiation Physics with practical training in applied aspects of basic physics pertaining to radiology.
2. Rotational posting in various sub-specialties.
3. PG activities which include seminars, journal clubs, film reading sessions, case discussions.
4. Research methodology and thesis.

## **SYLLABUS**

### **1. BASIC SCIENCES RELATED TO RADIODIAGNOSIS**

#### **i] Basics of Radiography and equipment's**

1. Radiation physics and its biological effects
  - Introduction to general properties of radiation
  - Production of X-Ray
  - Characteristic properties of X-Ray
  - Interaction of X-Rays with matter and their effects
  - Units of radiation, radiation measurement
  - Image receptors, X-Ray films, intensifying screen
  - Formation of radiographic image

- X-Ray equipments, Conventional X-Ray Units, Fluoroscopy units (conventional, image intensifier)
  - Functioning of Computed Radiography (CR), Digital Radiography (DR), Mammography.
  - Advanced imaging equipments viz. US, Doppler, CT, MRI, Cine fluoroscopy, Tomography, Digital Subtraction, Angiography (DSA)&PETCT, their principles and applications.
  - Film processing dark room equipments and procedures - manual, automatic,
  - Processing of CR/DR.
2. Quality assurance & clinical audit.
  3. Radiation hazards, principles and methods of radiation protection.
  4. Contrast media: various types, chemistry, mechanisms of action, dose schedule, routes of administration, their potential adverse reactions and management.
  5. Diagnostic use of important isotopes in different organ systems, equipment in Nuclear Medicine and their recent advances.
  6. Computers in radiology, teleradiology and networking.
  7. Picture Archiving and Communication System (PACS) and Radiology Information System (RIS) to make a filmless department.

### **ii] Basics of Computed Tomography (CT)**

- Basic physics in CT e.g., selection of slice thickness, pitch, partial volume effect, field size and effect on resolution, data storage and display pixel/ voxel, window width and level.
- Principles of contrast agents used in CT.
- Identification of common artifacts & measures to reduce them.
- Advanced CT techniques like virtual imaging, CT coronary angiography, CT perfusion and various angiographies.

### **iii] Basics of Diagnostic Ultrasound & Doppler**

- Basic components of an ultrasound system
- Types of transducers and the production of ultrasound with emphasis on operator controlled variables
- Frequencies used in medical ultrasound
- Interaction of ultrasound with tissue including biological effects
- Basic principles of A, B, M, real time and duplex scanning
- Basic principles of pulsed, continuous wave and color Doppler ultrasound
- Principles of ultrasound contrast agents
- Recognition and explanation of common artifacts

- Advances like Tissue Harmonic/Compound Imaging, 3D/4D US, contrast US and elastography.

#### **iv] Basics of Magnetic Resonance Imaging (MRI)**

- Basic principles and components of the system, origin of the signal and room construction
- Concept of T1, T2 proton density and effects of motion on signal, magnetic resonance angiography
- Basic principles of common sequences used in clinical practice as well as advances in pulse sequences
- Overview of specialized MR techniques including MR angiography, MR spectroscopy, diffusion and perfusion imaging
- Principles of contrast agents
- Magnetic field and radiofrequency hazards to patients, staff and passerby
- Recognition and explanation of common artifacts & methods to reduce them.

## **2. RESPIRATORY SYSTEM**

### **Content**

- Anatomy of the lungs, including segmental anatomy, bronchial tree and pleural as demonstrated by radiography, bronchography and cross-sectional imaging including HRCT thorax
- 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.

### **At the end of the posting resident should be able to**

- Localize the chest pathology into one of the following compartments: pulmonary, pleural, mediastinal, extra-pleural, extra-thoracic, diaphragmatic, infra-diaphragmatic.
- Recognize chest pathology that requires urgent or emergency treatment and describe it in an adequate manner: pneumothorax, traumatic aortic rupture, esophageal rupture, acute pulmonary embolism, CHF and tracheobronchial 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.

- Recognize and describe appropriately the various manifestations of benign and malignant neoplasms of the lung.

### **3 GASTROINTESTINAL AND HEPATOBILIARY SYSTEM**

#### **Content-**

- Radio-anatomy of GIT, liver, pancreas, biliary system and spleen.
- Diseases and disorders of oral cavity, 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.

#### **At the end of the posting resident should be able to**

- Evaluate the clinical condition & decide the appropriate studies
- Practice the approach for evaluating GIT or hepato-biliary-pancreatic system of a patient.
- Develop a proper approach to fluoroscopy to yield satisfactory results which also includes proper equipment handling and using proper radiation protection measures (both for the patient and the operator).
- Identify anatomic variants, basic pathology & pathophysiology of GIT/hepato-biliary-pancreatic diseases in fluoroscopy as well as in CT and MRI.

### **4 GENITOURINARY SYSTEM**

#### **Content-**

- Anatomy of Genitourinary system and
- Various diseases and disorders of Genitourinary system viz. congenital, inflammatory/infectious, traumatic, neoplastic, calculus diseases and miscellaneous conditions.

#### **At the end of the posting resident should be able to**

- Perform and interpret conventional excretory urography (intravenous pyelography); cystograms, micturating cystourethrography (MCU)

and retrograde urethrography (RGU) and other diagnostic imaging procedures which are used to evaluate urinary tract pathology i.e., ultrasound, CT, MRI, angiography.

- Identify and evaluate emergency conditions of urinary tract including trauma, infection, vascular compromise and obstruction.
- Recognize various infectious diseases and the modalities for diagnosis.
- To evaluate various renal and urinary system masses including the detection and staging of the tumor.
- To perform vascular/non-vascular interventions of Genitourinary system.

## **5. MUSCULOSKELETAL SYSTEM**

Content –

- Anatomy various bones, joints and soft tissues
- Imaging (Conventional, ultrasound, CT, MRI, Angiography, Radioisotope studies).
- Interpretation of diseases of muscles, soft tissue, bones and joints including congenital, inflammatory, traumatic, metabolic, endocrine, neoplastic and miscellaneous conditions.

**At the end of the posting resident should be able to**

- Precisely diagnose the radiographs of bones and joints.
- Differentiate various forms of arthritis and correlate with laboratory and clinical findings.
- Enumerate the radiographic features of various bone tumors - both benign and malignant bone tumors.
- Recognize 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 disorders e.g. osteomalacia, hyperparathyroidism etc.
- Decide the application and interpretation of ultrasound/CT/MRI/Angiography in any conditions affecting bone.

## **6. CARDIOVASCULAR RADIOLOGY**

### **Content –**

- Anatomy of heart on various imaging modalities.
- Diseases and disorder of cardiovascular system (congenital and acquired conditions) and the role of imaging by conventional radiology, ultrasound, Color-Doppler, CT, MRI, Angiography, Radio nuclide studies.

### **At the end of the posting resident should be able to**

- Understand the anatomy and 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 coronary artery diseases, in aortic diseases e.g., aorto-arteritis, aortic dissection and aortic aneurysm.
- Should be able to differentiate different valve position (after valve placement) and identify complications after valve replacement.

## **7. NEURORADIOLOGY**

### **Content-**

Radio-anatomy and imaging (using conventional and newer methods) and interpretation of various diseases and disorders of the head, neck and spine covering congenital, infective, vascular, traumatic and neoplastic conditions.

### **At the end of the posting resident should be able to**

- Acquire detailed normal neuro-imaging anatomy and pathology on different imaging modalities.
- Perform neurointerventions under supervision.

## **8.GENERAL RADIOLOGY**

In the rotational posting, the resident should

- Learn to take and evaluate conventional radiographs. This includes radiographs of: chest, abdomen, pelvis, skull, spine, musculo-skeleton, soft tissues, and mammography.
- Be able to decide on further imaging views based on the clinical suspicion.
- Be able to draw conclusion / differential diagnosis and mention it in precise and concise way in the report.
- Present interesting cases in the departmental meets.

## **9. ULTRASOUND (INCLUDING GYNAE/OBSTETRICS)**

At the completion of this rotation in the ultrasound, the resident should be able

- To perform and interpret all ultrasound studies. These studies include: abdomen, pelvis, small parts, neonatal head, color-duplex imaging (including peripheral i.e. extremity arterial and venous studies), obstetrics/gynecology.
- To perform all ultrasound guided diagnostic and interventional procedures.
- The resident should have a thorough knowledge of the common abnormalities of the abdominal/pelvic organs, retroperitoneal structures, neck, chest, extremities and small parts (thyroid/parathyroid, scrotum, orbit, breast).
- To select the appropriate diagnostic procedure for the clinical problem and demonstrate expertise in patient scanning using appropriate parameter and probe selection .
- Analyze the results and record the findings and communicate them to referring physician.
- Present interesting ultrasound cases in the departmental meetings.

## **10.COMPUTED TOMOGRAPHY**

At the completion of this rotation in CT, the resident should

- Be able to determine appropriate CT examination required, based on patients clinical condition and see additional images to be taken in particular pathology.
- Schedule the CT examinations and perform CT examination which includes positioning of patient, selection of parameters, contrast administration.
- Acquire knowledge of CT findings of the common pathologic conditions occurring in the head, neck, chest, abdomen, pelvis, in the soft tissues and musculoskeletal system.
- Be familiar with both the conventional and different modified CT techniques e.g. High resolution, Dual phase, CT angiography, BMD, multislice CT etc.
- Interpret conventional and modified body CT examinations (including HRCT, dual/triple phase CT, CT portography, virtual CT etc.) with a reasonable degree of accuracy.
- Efficiently write the CT findings, differential diagnosis and communicate with referring physician.
- Have knowledge of the limitations of CT imaging of various pathologic conditions and be able to perform correlations with other imaging modalities including formulations of recommendations for additional appropriate imaging procedures.
- Perform CT guided biopsy procedures under supervision.
- Present interesting cases of CT in the departmental meetings.

## **11.MAGNETIC RESONANCE IMAGING (MRI)**

At the completion of this rotation in MRI ,the resident should

- Be able select MRI protocol according to the clinical diagnosis and additional sequences needed in particular pathology.
- Schedule the MRI examinations and perform it which includes positioning patient, selection of coils, parameter selection , decision of whether to administer contrast based on acquired images.
- Acquire knowledge of MRI findings of the various pathologic conditions occurring in the head, neck, abdomen, pelvis, in the soft tissues and musculoskeletal system.
- Acquire knowledge of conventional and modified MRI examinations, including MRA,MRV, MRCP, MRS.

- Efficiently write the MRI findings, differential diagnosis and communicate them with referring physician.
- Identify limitation of MRI and suggest alternative method to diagnose and differentiate various artifacts along with measures to reduce them.
- Perform MRI guided intervention procedures under supervision.
- Present interesting cases of MRI in the departmental meetings.

## 12. INTERVENTIONAL RADIOLOGY

At the completion, the resident should

- Be able to select appropriate diagnostic procedure for the clinical problem.
- Be able to perform the most common non-cerebral angiographic procedures under supervision.
- Have basic understanding of normal vascular anatomy applicable to angiographic procedures performed and know normal anatomy and landmarks to perform other non-vascular procedures
- Have a knowledge of vascular interventional radiologic procedures such as angioplasty, embolization using various embolizing agents as well as the various non-vascular interventional procedures such as percutaneous nephrostomy, stenting, abscess drainage, PTC/PTBD, percutaneous biopsy, balloon dilatation of the esophagus etc.
- Have a good understanding of the various equipment and available catheters, guidewires and other technical aspects of special procedures.
- Know all the potential risks and complications of these procedures and their management.
- Present interesting cases in the departmental meets.

## 13. PAEDIATRIC RADIOLOGY

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

**At the end of the posting resident should be able to**

- Understand the indications for various imaging procedures and check for preprocedural preparation.

- Have the knowledge of standard radiographic views for pediatric examinations.
- Learn to recognize and evaluate imaging manifestations (on conventional and newer methods) of common pediatric conditions occurring in the head/neck, chest, abdomen/pelvis and in the Musculo-skeleton.
- Perform pediatric fluoroscopic examinations.
- Understand and apply the knowledge and principle of radiation protection; both for the child and the operator.
- Be able to interpret the results of conventional and newer pediatric examinations which include: upper airways, chest, genitourinary, gastrointestinal and musculoskeletal systems.
- Resident should be familiar with many of the neurologic conditions encountered in neonates and children. Resident should also be able to perform and interpret transcranial ultrasound.

#### **14.RADIOLOGY IN EMERGENCY MEDICINE**

At the end of the course, resident should

- Be able to evaluate emergency radiographic examinations and perform and interpret the same
- Be familiar with medicolegal cases (MLC) procedures.
- Communicate findings, diagnosis or differential diagnosis to the emergency room physician and guide for further imaging if needed.
- Be able to perform and interpret special imaging procedures needed in emergency room e.g., barium studies, excretory urography, CT, ultrasound, doppler and angiography.

#### **15.MAMMOGRAPHY AND BREAST INTERVENTION**

At the end of the posting resident should be able to

- Perform mammography both conventional and digital and interpret the results.
- Perform sono-mammography, MRI breast and interpret results.
- Have a good knowledge of benign and malignant breast lesions and their appearances on different modalities.
- Perform image guided procedures.

## **16. NUCLEAR MEDICINE**

During the rotation, the resident should

- Observe and assist some common procedures (thyroid, kidney, bone, cardiac scans)
- Be able to interpret common nuclear medicine examinations with a good understanding of the physical and biological properties of common radiopharmaceuticals including the basic radiation safety measures while dealing with them and also interpret PET-CT scans.

## **TEACHING SCHEDULE**

Post graduate training is a self-directed program where students learn from clinical and academic work which is boosted by the formal teaching sessions.

### **Teaching Sessions**

In addition to conducting and reporting of routine and special investigation in the area of posting under supervision, formal teaching session to be held on working days.

### **Weekly Schedule**

The suggested departmental teaching schedule is as follows:

1. Seminar- Once a week
2. Film Reading -Once a week
3. Case presentation /Physics Seminar - Once a week
4. Inter department meet / journal club /guest lecture- Once a week

Note:

- All sessions will be coordinated by the faculty members.
- All the teaching sessions to be assessed by the consultants at the end of session and graded
- Attendance of the Residents at various sessions should be >80%

## ROTATIONAL POSTING

The postgraduate student should be posted in all sections (Conventional radiology, U/S, CT, MRI , DSA etc.) so that there is adequate exposure to all modalities.

### MD (Radiodiagnosis), Posting Schedule

Total Duration: 3 years

Applied Physics and Basic Science

FIRST YEAR	SECOND YEAR	THIRD YEAR
<ul style="list-style-type: none"> <li>• Conventional Radiology — 2 months</li> <li>• Emergency radiology -1month</li> <li>• Genitourinary-2 months</li> <li>• Musculoskeletal radiology-1 months</li> <li>• Gastrointestinal-2 months</li> <li>• Ultrasound -2 months</li> <li>• CT –2 month</li> </ul>	<ul style="list-style-type: none"> <li>• Ultrasound with intervention -2 months</li> <li>• CT with intervention -2 months</li> <li>• Angiography with intervention- 2 months</li> <li>• MRI -2 months</li> <li>• Emergency radiology-2months</li> <li>• Neuroradiology -1 months</li> <li>• Musculoskeletal radiology-1 month</li> </ul>	<ul style="list-style-type: none"> <li>• Ultrasound with intervention -2 months</li> <li>• CT with intervention-2months</li> <li>• MRI- 2 months</li> <li>• Angiography with interventions-2 months</li> <li>• Gastrointestinal radiology-2 months</li> <li>• Elective posting-2 months</li> </ul>

Interdepartmental rotational Posting will be done in following departments

	Departments	Time period /duration	Objectives
1	General surgery	10 days in 3 <sup>rd</sup> /4 <sup>th</sup> semester	To get acquainted with various surgical conditions and the role of radiology in reaching the

			diagnosis of these patients
2	General Medicine	10 days in 3 <sup>rd</sup> /4 <sup>th</sup> semester	To get acquainted with principles of general medicine and various medical condition and role of radiology in reaching the accurate diagnosis
3	Obstetrics and gynaecology	10 days in 3 <sup>rd</sup> /4 <sup>th</sup> semester	To get acquainted with principles of Obstetrics and gynaecology and role of radiology in reaching the accurate diagnosis
4	Nuclear medicine	1month in 3 <sup>rd</sup> /4 <sup>th</sup> semester	To get acquainted with principles of Nuclear medicine and should be able interpret the results of common procedures

## THESIS

1. Each MD candidate is required to carry out work on a selected research (dissertation) under the guidance of a recognized post graduate teacher.

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. Chief guide will 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 Dean of the Institute 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 should consist of:-

- Introduction and objectives of the research project.
- Brief review of literature
- Suggested material and methods
- Bibliography

5. Such thesis protocol will be reviewed and the dissertation topic will be registered by the Institute.

Activity	January admission	July admission
Selection of topic in consultation with PG Guide	March / April	September / October
Approval by Department PG Committee		
Institute Scientific Committee approval	May / June	November / December
Institute Ethics Committee approval		
Final approval letter by Academics Section	30th June	31st December

No change in the dissertation topic or guide shall be made without prior approval of the Dean of the Institute.

6. Submission of thesis.

Thesis will be submitted at the end of two and a half (2.5) years.

Thesis should consist of

- Introduction
- Review of literature
- Aims and objectives
- Material and methods
- Results
- Discussion
- Summary and Conclusions
- Tables

- Annexures
- Bibliography

7. Two copies of dissertation thus prepared shall be submitted to the Dean AIIMS, six months before the final examination.

8. The dissertation shall be valued by two external examiners appointed by the Institute. Approval of dissertation work is an essential precondition for a candidate to appear in the final MD examination.

Dissertation is graded as follows :

- Highly commendable
- Commendable
- Satisfactory
- Rejected

## **ASSESSMENT**

All the PG resident are assessed daily for their academic activities and also periodically. Formative, continuing and summative (final) assessment is conducted in theory as well as practical examination as per institutional guidelines.

### **Formative Assessment:-**

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

1.Theory:

S.NO	Schedule	marks
1	At the end of first Year	100 (1 Paper)
2	At the end of second Year	100 (1 Paper)
3	Pre professional	400(4 papers of 100 march each)
	Total	600

## 2. Practical-

S.NO	Schedule	Marks
1	At the end of first Year	100 (1 Paper)
2	At the end of second Year	100 (1 Paper)
3	Pre professional	400(practical with viva)
	Total	600

- Candidate should secure a minimum of 50% marks in Theory and Practical separately; in order to be eligible to appear for Professional Examination.
- The post graduate students would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which would be published/accepted for publication/sent for publication during the period of his/her postgraduate studies so as to make him/her eligible to appear at the post graduate degree examination.

### **Summative assessment**

<b>1</b>	Theory	4 Papers each of 100 Marks = 400 Marks
<b>2</b>	Practical	400 Marks

#### Final Result

(1) Theory – 400 Marks (Minimum 40% marks in each paper and aggregate of 50% in order to be declared pass)

(2) Practical – 400 Marks

Minimum 50% marks required in Theory & Practical separately; in order to be declared successful at MD Examination.

### **SCHEME OF THEORY EXAMINATION (400 Marks)**

Pattern of Question Paper for final MD examination

<b>Paper</b>	<b>Title</b>	<b>Marks</b>
Paper 1	Basic sciences related to radiology	100
Paper 2	Principles and practice of	100

	Radio-diagnosis	
Paper 3	Radio-diagnosis as related to pathology	100
Paper 4	Recent advances & radiology as applied to other specialties.	100

**Practical Examination and Viva voce (Total=400)**

1. One long case 100
2. Two short cases 100
3. Imaging spots (50 spots) 100
4. Radiation physics VIVA 50
5. Practical Radiography /USG demonstration 50

**Eligibility to appear for professional examination:**

Sr. No	Parameters	Criteria
1	Research methodology examination conducted at the end of induction program	Pass
2	Internal assessment marks	>50% marks in theory and practical
3	Dissertation	Accepted
4	MD Program attendance	>80% in each year
5	Poster and paper presentation in conference	1 poster and 1 paper presentation
6	Peer reviewed Indexed Publication	One(accepted/published/sent for publication)
7	Six monthly progress report	At least 4 out of 6 satisfactory progress report

**SUGGESTED BOOKS**

**Main textbooks :-**

- Sutton: Text book of Radiology and Imaging volume-I-II.

- Grainger and Allison's Diagnostic Radiology: Text book of Medical Imaging
- Haaga J.R.: Computed Tomography and MRI volume-I and II
- Rumack: Diagnostic ultrasound volume I & II
- Osborn A.G.: Diagnostic neuro-radiology

**Reference books:-**

- Lee: Computed body tomography with MRI volume-I & II
- Jacobson's: Radiology of skeletal disorders
- Gore Levine: Text book of Gastrointestinal Radiology
- Margulis: Alimentary tract radiology volume I & II
- Davidson's: Radiology of the kidney and Genito-urinary tract
- Clark: Positioning in radiology
- Dahnert: Radiology Review Manual
- Webb: High Resolution CT of the lung
- Som and Curtin: Head and neck imaging
- Stark and Bradley: Magnetic resonance imaging Volume I & II
- Scott W. Atlas: MR imaging of the brain and spine
- Mittelstaedt CA : General ultrasound
- Callen: Ultrasonography in obstetrics and gynecology

**Journals:-**

- Indian Journal of Radiology
- Radiology
- Radiologic clinics of North America
- Seminars in U/S, CT and MRI
- American Journal of Neuro-Radiology

**Format for PG Logbook**

**All India Institute of Medical Sciences, Nagpur**

**Department of Radiodiagnosis**

**LOGBOOK**

**General information of candidate**

**Name:\_\_\_\_\_ Admission Year:**

**Academic Activities Attended**

S. No.	Date	Type of Activity:	Particulars	Sign of Faculty I/C
		Case presentation, Seminar, Journal club Presentation, UG teaching		

**POSTING SCHEDULE INCLUDING INTERDEPARTMENTAL POSTINGS.**

S.NO.	DEPARTMENT/ SECTION	MONTH AND YEAR		Remarks	Signature of HOD
		From	To		


**DETAILS OF EACH POSTING**

<b>S.NO.</b>	<b>NAME OF PATIENT</b>	<b>DATE</b>	<b>PROCEDURE</b>	<b>O/A/P/S</b>	<b>SIGNATURE OF CONCERN FACULTY</b>

**POSTER/PAPER PRESENTATIONS**

<b>S. No.</b>	<b>Name of Conference</b>	<b>Venue</b>	<b>Paper/Poster</b>	<b>Date</b>	<b>Signature of Faculty</b>

## ARTICLES PUBLISHED

S. No.	Title of Article	Name of journal	Type of Article	Authors	Details of article e.g., Year/ volume/issue/page no Volume	Signature of Faculty