King George's Medical University, U.P
Radiodiagnosis Department

Ref. No. ..1470/RD/2021

Date ..22/11/2021

सेवा में,

प्रो० उमा सिंह
अधिष्ठाता-एकेडमिक्स
किंग जॉर्ज चिकित्सा विश्वविद्यालय
लखनऊ

OFFICE THE DEAN
Ref. No 1138
Dt 18/11/21
K.G. Medical University, U.P. LKO

महोदया,

आपके कार्यालय पत्रांक संख्या Dean-Academics/KGMU/2021/35/8 दिनाक 21.10.2021 का सन्दर्भ ग्रहण करने का कृपा करे ।

आपको रेडियोडायग्नोसिस विभाग में चलाये जा रहे पी०जी० पाठ्यक्रमो का विवरण आपके द्वारा भेजे गए प्रारूप के अनुसार भरकर (संलग्नक) आपको अग्रिम कार्यवाही हेतु प्रेषित किया जा रहा है ।

सधन्यवाद

भवदीया

(Dr [illegible] OHLI)
डॉ० नीरा कोहली
विभागाध्यक्ष
रेडियोडायग्नोसिस विभाग
किंग जॉर्ज मेडिकल विश्वविद्यालय
लखनऊ

GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR MD IN RADIODIAGNOSIS

GOAL

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

SPECIFIC LEARNING OBJECTIVES

OBJECTIVES

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

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 organ systems.

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
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

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 etc.
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 is maintained by the student and is checked and signed regularly by the faculty-in-charge during the training program.

Rotations:

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

1. Conventional chest, abdomen, musculoskeletal including skull, spine, PNS and mammography etc	8 months
2. Contrast studies: G.U., GIT, Hepato-biliary, angiography etc including fluoroscopic guided interventions	8 months
3. US, Doppler and US guided interventions	8 Months
4. CT and CT guided interventions	6 Months
5. Emergency radiology	2 Months
6. M.R.I.	2 Month
7. Elective posting	2 Months

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

PROPOSED SCHEDULE FOR ROTATION

1st year	Intervention	Conventional	Emergency	USG
2nd year	Intervention	CT	Emergency	USG
2nd year	Intervention	CT	MRI	USG
3rd year	Intervention	CT	MRI	USG

ASSESSMENT

General Principles

Internal Assessment is frequent, cover all domains of learning and used to provide feedback to improve learning; The Internal Assessment is conducted in theory and practical/clinical examination.

6 monthly 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**

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

Postgraduate Examination

The Post Graduate Examination was conducted in three parts.

1. 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

external examiners, who shall not be the examiners for Theory and Clinical examination. A post graduate student shall be allowed to appear for the Theory and Practical/Clinical examination only after the acceptance of the Thesis by the examiners.

2. Theory Examination

The examinations 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 50% marks in 'Theory' as well as 'Practical' separately shall be mandatory for passing examination as a whole. The examination for M.D. shall be held at the end of 3rd academic year. An academic term shall mean six month's training period.
There shall be four theory papers:
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.

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

Practical Examination will have:
1. 3-4 Cases
2. Film Quiz (50 – 60 Spots)
3. To perform Ultrasound on a patient

Oral/Viva voce will include:

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

Suggested Reading:

Books (latest edition)

1. Grainger & Allison's Text book of Diganostic Radiology (Churchill Livingstone)
2. Textbook of Gastrontestinal Radiology- Gore and Levine (Saunders)
3. MRI of Brain and Spine - Scott Atlas (LWW)
4. Diagnosis of Diseases of the Chest -Fraser
5. Diagnostic Imaging Series: (Amirsys, Elsevier)
   Abdominal Imaging, Orthopedics, Head and Neck, Neuroradiology, Pediatric Radiology Chest, Obstetrics, Breast

10. CTI and MRI of the whole body- John R. Haaga
11. Text Book of Radiology and imaging - Davod sulton
12. Diagnostic ultrasound - Carol C. Rumack
13. AIIMS-MAMC-PGI's Comprehensive Textbook of Diagnostic Radiology, Volumes 1, 2, 3

Journals

03-05 international Journals and 02 national (all indexed) journals
1. American Journal of Roentgenology
2. Radiology
3. Seminars in Ultrasound, CT, MRI
4. Radiographics
5. Clinical Radiology
6. British Journal of Radiology
7. Radiological Clinics of North America
8. Pediatric Radiology
9. Australasian Radiology
10. Journal of Computerized Axial Tomography
11. Clinical Imaging
12. MR Clinics of North America
13. Seminars in Roentgenology

Annexure I

Postgraduate Students Appraisal Form
Pre / Para /Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training :

FROM.....TO.....

Sr. No	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	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				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications

Remarks*_____ Yes/ No

_____

_____

_____

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

SIGNATURE OF ASSESSEE SIGNATURE OF CONSULTANT SIGNATURE OF HOD

DATE	DAY	ACTIVITY	PRESENTER	TOPIC
30/8/2021	Monday	Lecture	Dr. Anit Parihar	Artificial intelligence in radiology
31/8/2021	Tuesday	Journal club	Dr. Gourav	TB VS Pyogenic spondylodiscitis
1/9/2021	Wednesday	Seminar	Dr. Dhiraj	HSG
2/9/2021	Thursday	Case presentation	Dr. Gaurang	Budd chiari syndrome
3/9/2021	Friday	Spotters	Dr. Vaibhav Gupta	
6/9/2021	Monday	Lecture	Dr. Neera kohli	Pediatric abdominal masses
7/9/2021	Tuesday	Journal club	Dr. Naba	4D CT
8/9/2021	Wednesday	Seminar	Dr. Durga	Radiation protection
9/9/2021	Thursday	Case presentation	Dr. Krishna	VHL
10/9/2021	Friday	Spotters	Dr. Nitish	
13/9/2021	Monday	Lecture	Dr. Sukriti Kumar	Breast microcalcifications and stereotactic biopsy
14/9/2021	Tuesday	Journal club	Dr. Santosh	CSF flow analysis
15/9/2021	Wednesday	Seminar	Dr. Vivek	IVP
16/9/2021	Thursday	Case presentation	Dr. Reetinder	Pheochromocytoma
17/9/2021	Friday	Spotters	Dr. Priya	
20/9/2021	Monday	Lecture	Dr. Manoj kumar	TIPS in case of budd chiari syndrome
21/9/2021	Tuesday	Journal club	Dr. Gourav	MR Urography
22/9/2021	Wednesday	Seminar	Dr. Vasav	Renal doppler
23/9/2021	Thursday	Case presentation	Dr. zainab	Ameloblastoma of tibia
24/9/2021	Friday	Spotters	Dr. Vaibhav Gupta	
27/9/2021	Monday	Lecture	Dr. Amit Verma	Mediastinal masses
28/9/2021	Tuesday	Journal club	Dr. Naba	MR lymphangiography
29/9/2021	Wednesday	Seminar	Dr. Dhiraj	USG artifacts
30/9/2021	Thursday	Case presentation	Dr. Gaurang	
1/10/2021	Friday	Spotters	Dr. Nitish	
4/10/2021	Monday	Lecture	Dr. Durgesh Dwivedi	DCE perfusion MRI.
5/10/2021	Tuesday	Journal club	Dr. Gourav	Imaging of glenoid labrum & labral tears.
6/10/2021	Wednesday	Seminar	Dr. Durga	USG physic
7/10/2021	Thursday	Case presentation	Dr. Krishna	Pancreatic TB
8/10/2021	Friday	Spotters	Dr. Vaibhav Gupta	
11/10/2021	Monday	Lecture	Dr. Anil rawat	Evaluation of shoulder joint on USG
12/10/2021	Tuesday	Journal club	Dr. Naba	Imaging of immune therapy related pneumonitis.
13/10/2021	Wednesday	Seminar	Dr. Vivek	CT physics
14/10/2021	Thursday	Case presentation	Dr. Reetinder	RCC
15/10/2021	Friday	Spotters	Dr. Nitish	
18/10/2021	Monday	Lecture	Dr. Siddharth Mishra	Cardiac MRI
19/10/2021	Tuesday	Journal club	Dr. Vaibhav Jaiswal	Mri Wrist
20/10/2021	Wednesday	Seminar	Dr. Vasav	Contrast agents
21/10/2021	Thursday	Case presentation	Dr. Zainab	Periventricular ependymoma
22/10/2021	Friday	Spotters	Dr. Gourav	
25/10/2021	Monday	Lecture	Dr. Saurabh kumar	PTBD internalization in advanced cases of CAGB
26/10/2021	Tuesday	Journal club	Dr. Vaibhav Gupta	
27/10/2021	Wednesday	Seminar	Dr. Dhiraj	Mammography & its applicatory
28/10/2021	Thursday	Case presentation	Dr. Gaurang	MRI physics
29/10/2021	Friday	Spotters	Dr. Naba	