

***Residency Program  
Doctor of Medicine (MD)  
Curriculum (Phase A & B)***

***Radiology & Imaging***



**Bangabandhu Sheikh Mujib Medical University  
Dhaka, Bangladesh**

## C o n t e n t s

01.	Introduction	03
02.	Goals and Objectives	03
03.	Admission Requirements for Phase-A Training	03
04.	Content (Syllabus) Outline	03
05.	Teaching and Learning Methods: Phase-A	10
06.	Residency Phase-B	11
07.	Assessment	11
08.	Supervision and Training Monitoring	11
09.	Curriculum Implementation, Review and Updating	12
10.	Detail Content of Learning (The Syllabus)	13

### 1. Introduction:

Doctor of Medicine in Radiology & Imaging / MD (Radiology & Imaging).

### 2. Goals and Objectives:

Residency program of 5 years consisting of

- Phase-A – 2 years (6 month, 6 month, 6 month and 6 month)
- Phase-B – 3 years (3rd, 4th & 5th year).

### 3. Admission Requirements for Phase-A Training:

MBBS or equivalent qualification registered with BMDC.

- 1 year internship after passing MBBS or equivalent qualification registered with BMDC.
- Selection of the candidate will be on central basis following the rules and regulations for selection for MD Residency course in BSMMU.

### 4. Content (Syllabus) Outline:

#### Course Contents Phase-A

#### Basic subjects:

##### 1. Radiological Anatomy:

- I. Gross Anatomy with special stress on normal Radiological appearance.
  - Musculo-skeletal system
  - Kidney and urinary bladder
  - Male & Female genital tracts
  - Heart and blood vessels
  - Nervous system
  - Respiratory system
  - Gastro intestinal system.
- II. Developmental anatomy:

III. Applied anatomy in the form of identification of normal images of various parts of the body in radiographs & other Imaging systems.

**2. Radiological Physics:**

**I. General Physics-**

- Structure of atom
- Electromagnetic Radiation
- Interaction of radiation with matter
- Detection of Ionising radiation
- X-ray machine and production of X-ray
- Types of properties of X-ray
- Hazards of Radiation
- Protection from Radiation.

**II. Basic electronics and computer in medical science.**

- Ohms law
- Transformer
- Cathode ray tube
- AC and DC current Diode valve
- Rectification
- Semiconductor & semiconductor diode
- Application of computer in medical science.

**III. Radiography:**

- X-ray film, cassette, cassette holder
- Intensifying and fluoroscopic screen image intensifier
- Primary Radiological Image
- Development and Fixation of Image

- Dark room errors
- Factors focusing radiographic quality
- Autoprocessing.

**IV. Basic physics of-**

- Ultrasonography
- Computerized axial topography (CT)
- Magnetic Resonance Imaging (MRI)
- Nuclear Imaging
- Soft tissue Radiography
- The Mammography
- Tele-radiology, Digital imaging PACS etc.

**3. Medical Biostatistics:**

- Basic concept of biostatistics: definition, importance, uses scope and limitation and definitions and concepts of important terms and rates used in medical and vital statistics, standard death rates and concise life tables.
- Methods of data collection and concept of sampling
- Basic concept of probability and Frequency & probability distribution-concept and their application in medicine.
- Methods of displaying and projecting data.
- Correlation and regression and measures of variability.
- Basic concept of experimental designs to medical science clinical trial.
- Test of significance
- Methods and principles of recording and maintenance of information and requirements of health information system.

**Core Subject Phase-B****Paper-I****I. Musculoskeletal system:**

- Congenital skeletal anomalies, skeletal dysplasia, Chromosomal disorders.
- Techniques and imaging of soft tissues.
- Skeletal trauma.
- Bone tumours.
- Disorders of the lympho reticular system & other hemopoietic disorders.
- Metabolic & endocrine skeletal diseases
- Joint diseases
- Bones and soft tissue infections.

**II. The Respiratory & Thoracic Imaging:**

- Techniques in thoracic imaging.
- The normal chest: Methods of investigation & differential diagnosis.
- The chest wall, pleura, diaphragm and interventions.
- The Mediastinum, including the pericardium
- Pulmonary infections in adult and pediatrics.
- Large airway disease and chronic airway obstruction.
- Pulmonary lobar collapse: essential considerations.
- Pulmonary neoplasm
- High resolution computed tomography of interstitial and occupational lung diseases.
- Airspace disease
- Thoracic trauma and related topics
- The chest in children.

**III. The Cardio vascular system**

- Cardiac anatomy and imaging techniques.
- Pericardium.
- Congenital heart disease: general principle and imaging,
- Nonischaemic acquired heart disease.
- Ischaemic heart disease
- Pulmonary circulation and pulmonary thrombo-embolism.
- The Aorta, including intervention.
- Peripheral vascular disease.
- The lymphatic system.

**IV. The gastro intestinal & hepatobiliary Imaging:**

- The plain abdominal radiograph and associated anatomy and techniques.
- The esophagus.
- The stomach.
- The duodenum and small intestine.
- The large bowel
- Imaging of the peritoneum, mesentery and omentum
- The biliary system
- The liver & spleen.
- The pancreas.
- The adrenal glands.
- The pediatric abdomen.
- Imaging of the abdominal trauma.

**Paper-II****I. The Urognital Radiology**

- The genourinary tract : anatomy and imaging techniques.
- Renal parenchymal disease, including renal failure, renovascular disease and transplantation.
- Renal masses.

- Radiology of the upper urinary tract.
- Radiological evaluation of the urinary bladder, prostate and urethra.
- Trauma to the genitourinary tract. .
- The male reproductive system.

**II. Women's imaging**

- The breast
- Imaging in Obstetrics and infertility.
- Imaging in gynaecology

**III. Head & Neck Imaging :**

- Ear, nose and throat radiology
- The Orbit.
- Dental and maxillofacial radiology.

**IV. Neuro-radiology**

- Skull and brain: methods of examinations and anatomy.
- Benign and malignant intracranial tumours in adults
- Cerebrovascular diseases and nontraumatic intracranial haemorrhage
- Cranial and intracranial disease: infections AIDS, inflammatory, demyelinating and metabolic diseases.
- Cranial and intracranial disease: trauma, cerebrospinal fluid disturbance, degenerative disorders and epilepsy.
- The spine.
- Paediatric neuroradiology
- Interventional Neuroradiology

**V. Nuclear imaging of different systems.**

**VI. Forensic radiology**

**VII. Oncological radiology**

**Procedures to be observed and done personally and Individually by the Residents**

1. Dark room and film processing
2. Radiography – Conventional X-ray & Mammography.
3. Contrast Examination:
  - Barium study of esophagus.
  - Barium meal stomach and duodenum.
  - Barium meal follow through
  - Small bowel enema (Enteroclysis).
  - Barium enema examination of large gut.
  - IVU
  - MCU & RGU
  - Myelogram
  - Sialogram
  - Dacrocystogram
  - Fistulogram and sinugram
  - Loopogram
  - Hysterosalpingogram
  - PTC
  - ERCP.
4. Interventronal radiology:
  - Ultrasonogram & CT guided biopsy / Drainage etc.
  - Angioplasty
  - Stenting
  - PCN

**5. Teaching and Learning Methods: Phase-A****I. 6 months: Departmental Orientation**

- a) Conventional X-ray techniques
- b) Contrast studies
- c) Patient management regarding various imaging modalities.
- d) Radiological anatomy.

**II. 6 months: Clinical orientation with placement in different specialties**

- Internal Medicine 15 days
- Paediatrics 15 days
- Neuro-medicine 15 days.
- General surgery 15 days
- Hepatobiliary surgery 15 days
- Neurosurgery 15 days.
- Otolaryngology 15 days
- Urology 15 days.
- Emergency 15 days
- Orthopedic 15 days.
- Obstetrics & Gynaecology 15 days
- Nuclear Medicine 15 days.

**III. 6 months**

- a) Radiological physics X- ray. CT. USG. MRI & Nuclear Imaging.
- b) Radiography and Radiological procedures

**IV. 6 months (Theoretical classes will be arranged by negotiation with respective departments)**

- a) Radiological Anatomy
- b) Bio-Statistics.

**6. Residency Phase-B (3rd, 4th & 5th year):**

Successful candidate in part A examination will be eligible to enter into the residency program of Phase-B and structured course for final part of MD (Radiology & Imaging).

This part comprises of core theory of Radiology, Practical and Hands on jobs in Radiology, Interventional radiological procedures, Departmental seminars, Case presentation, Journal club, Research on specific topic and preparing thesis paper and should have at least two publication in recognized Journals.

**7. Assessment:**

- a) Residency program will be monitored and evaluated by Log Book throughout the course. Log book will be maintained throughout the 5 years to monitor the course and for assessment.
- b) University examination on Radiological Physics, Radiological & Functional Anatomy and Bio-statistic will be taken after 2 years of completion of Phase-A residency training.
- c) Those who will not be able to pass this examination, may be allowed to sit for next 4 consecutive examinations.
- d) At the end of Phase-B of 3 years duration a candidate will have to sit for a final examination for MD (Radiology & Imaging).

**8. Supervision and Training Monitoring:**

1. Residents shall acquire adequate standard of knowledge, skills and attitudes patients care and examinations in Radiology & Imaging.

2. Residents will have a humanitarian approach and good communication skill with patients, attendants, colleagues and other auxiliary staffs.

3. Residents shall acquire competency in Radiology and Imaging, Practical skill and radiographic techniques and should be able to perform special & routine radiological procedures.

### 9. Curriculum Implementation, Review and Updating:

Phase-A competency can be assessed by Phase-A university examination.

It will be taken at the end of 2 years course (Phase-A).

A multi format examination will be taken comprising written, clinical (long case & short case) and practical (SCA) examination.

#### i) Written

Written test will be used to assess knowledge and problem solving components of competence. It will be taken as

a) SEQ/MCQ

b) Short narrative question.

The traditional unstructured clinical viva voce examination will be replaced by more structural objective type of examination known as objective structured practical examination (OSPE).

Phase-B examination will comprise of written, oral, practical & clinical examination and thesis submission and defense and Log Book assessment

a) Written, oral, practical and clinical examination will be taken as traditional way. In course of time both clinical and oral examinations may be structured to ensure uniformity.

b) The examinee must submit the thesis at least six months before appearing the Part-B final examination.

- c) The examinee will be certified after
- Completion of Part-B course.
  - Passing the oral, practical & clinical examination and written examination.
  - After satisfying the examiner in the thesis defense examination.

### 10. Detail Content of Learning (The Syllabus):

Phase-A (Candidate will be eligible to appear in the Phase-A final examination after satisfactory assessment by department including log book).

Paper I Radiological physics	Parts of Examination	Marks allotted	Pass Mark
Group A Radiological Physics, Basic Electronics and Basic Physics of X- ray, Nuclear Imaging, Computed and Digital radiography.	Written (Essay type & short narrative)	Paper I 100 Paper II 100	60 60
Clinical application of CT techniques PET, SPECT, DEXA	SCA (50 % from Paper I & 50 % from Paper II)	100	60
Group B Basic Physics of Computed Tomography (CT), Ultrasound and MRI with their clinical application. Clinical Radiology	Clinical (Paper I & Paper II combindly) Long case Short case/ Oral	100 100	60 60

**Residency Program**

**Radiology & Imaging**

Paper II Radiological Anatomy	Parts of Examination	Marks allotted	Pass Mark
Group A General and functional anatomy Group B Radiographic and imaging anatomy. Living imaging anatomy on the basis of respective imaging modalities e.g.; sonographic, CT & MRI anatomy of the living human subject	Written (Essay type & short narrative)		

**Phase-B (Core Training in Radiology)**

(Candidate will be eligible to appear in the Phase-B final examination after satisfactory completion of 3rd, 4th & 5th year core training & Log Book assessment)

**Compartment A**

Parts of Examination	No of examinati on paper	Name of subject	Marks allotted	Pass Mark
Written	Paper-I  (Short Essay narrative type)	Respiratory & Thoracic Imaging Cardiovascular Radiology GI & Hepatobiliary Radiology Musculoskeletal Radiology	100	60
	Paper-II (Short Essay narrative type)	Neuro-radiology Head & Neck Radiology Urogenital Radiology Womens Imaging (Obstetrics &	100	60

**Residency Program**

**Radiology & Imaging**

		Gynaecology and Breast) Soft tissue Radiology Interventional Radiology Nuclear Imaging		
SCA /OSPE	Paper-I & II		100	60
Oral	Paper-I & II		100	60
Clinical	Paper-I & II			
Long case			100	60
Short case			100	60

**Compartment B**

Thesis			200	120
Thesis Defense			100	60
Log Book assessment			100	75