



Bachelor of Medical Radiology & Imaging Technology (BMRIT)

EFFECTIVE FROM

ACADEMIC SESSION: 2025 – 2026 ONWARDS

SYLLABUS

**DEPARTMENT OF ALLIED HEALTH
(सहबद्ध स्वास्थ्य विभाग)**

Faculty of Health Sciences, Jharkhand Rai University, Ranchi

SEMESTER – III

Program: BMRIT
Semester: III
Subject: Pathology
Code: 42BBMRIT017

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Course Outcome:

On completion of the Course, the students will be able to:

CO1: Describe the basic concepts of cell injury, inflammation, repair, and infectious diseases.

CO2: Explain the principles of neoplasia, clinical pathology, hematology, and blood banking.

CO3: Apply pathological knowledge to common diseases and interpret basic laboratory investigations.

CO4: Analyze the pathology and laboratory findings of cardiovascular, respiratory, renal, and bone disorders.

CO5: Evaluate pathological findings to recommend appropriate diagnostic approaches.

Course Content: Pathology

Topics and contents	Hours
UNIT – I: General Pathology and Inflammation	10
Introduction to Pathology, Cell membrane, Cytoplasm, contents and nucleus Various injuries – Cell changes – Reversible changes, fatty liver, hydropic changes and Irreversible changes Irreversible changes – Necrosis. Types with examples. Apoptosis Pigments – Classification. Bilirubin, melanin, pathological calcification Inflammation – Definition, classification, signs, vascular & cellular events in acute inflammation Repair and wound healing, fracture healing, complications, factors influencing healing Infectious diseases – Tuberculosis, leprosy, fungal diseases, malaria	
UNIT – II: Cellular Adaptations, Neoplasia and Clinical Pathology	15
Oedema – Definition, classification, causes, pathogenesis. Pulmonary oedema, cardiac oedema, Renal oedema, Lymphedema Thrombosis–Definition, classification, pathogenesis, venous and arterial thrombosis, fate of thrombus Embolism – Definition, classification and clinical manifestations – Infarction, gangrene Cellular adaptations and Growth disorders: Atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia and neoplasia Neoplasia (Tumors) – Definition, nomenclature, differences between benign and malignant tumors metastasis Causes (carcinogens), clinical features and lab diagnosis of cancers Genetics – Genetic diseases, cause, Common cytogenic diseases – Klinefelter, Downs and Turners syndrome. Complete urine examination – physical, chemical, microscopy of sediment Liver function tests, Renal function tests Cytology, FNAC, Surgical pathology, biopsy, resected specimen preservation, fixation and filling of request forms.	
UNIT – III: Hematology and Blood Banking	15
Blood collection for investigations, anticoagulant. Sample collection, labeling, transportation to labs Common hematological tests – Peripheral blood smear, Haemoglobin, Packed cell volume, WBC count – variation of total and differential leukocyte count, Platelet count Bone marrow Aspiration and biopsy; Indications, procedure, contraindications and complications Anemias – Definition, classification, Iron deficiency anemia, causes, clinical features and lab diagnosis Megaloblastic anemia – cause, classification, diagnosis. Briefly hemolytic anemia Leukemia – Definition, classification, lab diagnosis of Acute Leukemias (AML & ALL) and Chronic Leukemias (CML & CLL) Bleeding disorders – Classification, Vascular, Platelet and coagulation factors contribution in clotting. Common Platelet disorders Common coagulation disorders (Hemophilia, DIC). BT, CT, Prothrombin time and APTT for diagnosis	

Blood grouping, cross matching, collection of blood from blood donors. Mandatory tests done in blood bank, blood components, complications of blood transfusion and its evaluation	
UNIT– IV: Bone and Cardiovascular Pathology	15
Osteomyelitis – Acute and chronic, Tubercular, causes, pathology & its complications Diseases of joints – Osteoarthritis and Rheumatoid arthritis – causes, aetiopathogenesis, pathology, complications Metabolic disease of bones – Osteoporosis, Osteomalacia, Rickets Cardiovascular diseases – Introduction, Atherosclerosis – definition, risk factors, sites/ organs, pathology manifestations, complications. Aneurysms – types, causes and complications Ischemic heart disease (IHD) – Types, Pathogenesis of Angina, Myocardial infarctions and its complications Rheumatic heart disease – etiology, pathogenesis and morphology of the heart Hypertension – definition, causes, complications Heart failure – Causes, pathophysiology, clinical manifestations and complications	
UNIT– V: Respiratory and Renal Pathology	15
Respiratory diseases – Chronic obstructive pulmonary Airway diseases – causes, pathology and complications of each (asthma, chronic bronchitis, emphysema, Broncheictasis in brief). Pneumonia – classification, clinical features and morphology Pulmonary tuberculosis – classification/ types, primary, complex, miliary TB and cavitary TB, complications Pleural effusion – definition, causes, clinical features and diagnosis Renal system; Glomerulonephritis, nephritic and nephrotic syndrome. Tubulointerstitial diseases, Renal failure – Acute and chronic Pyelonephritis – Types, causes, organ changes and complications. Renal stones – Causes, pathogenesis, clinical features. Hydronephrosis – causes, clinical features and diagnosis	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Textbook of Pathology with Pathology	Harsh Mohan	Jaypee Brothers Medical Publishers (P) Ltd
2	Pathology Basis of Disease	Robbins and Cotran	Saunders Elsevier
3	Text book on Pathology for DMLT & Paramedical Courses	Dr. I Clement	Emmess medical publishers
4	Text book of Pathology & Microbiology for Paramedical Students	Aruna Singh	Notion Press

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Program: BMRIT

Semester: III

Subject: Clinical Radiography Positioning - II

Code: 42BBMRIT018

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Describe dental and upper respiratory radiographic techniques.

CO2: Explain thoracic and abdominal radiographic procedures.

CO3: Apply mobile, ward, OT, and mammography techniques in radiography.

CO4: Demonstrate pediatric, neonatal, and forensic radiographic procedures.

CO5: Analyze specialized radiographic techniques and image quality factors.

CO6: Evaluate foreign body localization techniques for different clinical conditions.

CO7: Design appropriate radiographic techniques for specialized diagnostic needs.

Course Content: Clinical Radiography Positioning - II

Topics and contents	Hours
UNIT– I: Dental and Upper Respiratory Radiography	10
Dental Radiography Technique for intra oral full mouth. - Occlusal projections. - Extra oral projections including orthopantomography. - Supplementary techniques.	
Upper respiratory system Technique for postnasal airways, larynx, trachea, thoracic inlet, Valsalva maneuver. - Phonation.	
UNIT – II: Thoracic and Abdominal Radiography	10
Lung and Mediastinum: Supplementary projections: Antero-posterior, obliques, lordotic, apical projection, use of penetrated postero-anterior projection. - Expiration technique. - Technique for pleural fluid levels and adhesions.	
Abdominal viscera- Technique for plain film examination. - Projection for acute abdomen patients. - Technique to demonstrate: Foreign bodies, Imperforate anus.	
UNIT – III: Mobile Radiography and Mammography	10
Radiography using mobile X-ray equipment-Radiography in the ward: Radiography in the specialized unit, such as: Intensive care unit, Coronary care, Neonatal unit Radiography in the operating theatre.	
Mammography: Basic views, special views, wire localization.	
Localization of foreign bodies. Various techniques	
UNIT – IV: Ward, Operation Theatre and Trauma Radiography	10
Ward /mobile radiography – Electrical supply, radiation protection, equipment and instructions to be followed for portable/ward radiography.	
Operation theatre techniques: General precautions, Asepsis in techniques - Checking of mains supply and functions of equipment, selection of exposure factors, explosion risk, radiation protection and rapid processing techniques.	
Trauma radiography/Emergency radiography	
UNIT– V: Pediatric, Neonatal and Forensic Radiography	10
Neonatal and Pediatric Radiography, Forensic Radiography	
Microradiography: General principles, Requirement, Equipment, Technique.	
UNIT– VI: Specialized Radiographic Techniques	
Soft Tissue Radiography:	10

High and low kilo voltage technique; differential filtration. Non - screen technique - simultaneous screen and non -screen technique. Multiple radiography. Uses of soft tissue radiography. High kV Radiography: General principles Relation to patient dose Change in radiographic contrast. Scatter elimination; beam collimation; grid ratio. Speed and type of grid movement. Radiographic factor; application and uses	
UNIT – VII: Foreign Body Localization Techniques	
Localization of foreign bodies: General location principles. Ingested; inhaled; inserted; embedded foreign bodies. Foreign bodies in eye. Preparation of the area to be investigated. Appropriate projection for all Techniques to locate non-opaque foreign body.	10

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Radiological positioning	Merils	Mosby
2	A guide to radiological positioning	Clarks	CBS publishers and Distributor's pvt. Ltd
3	Radiology Of Positioning And Applied Anatomy For Students And Practitioners	GarkalGs	Jaypee Brothers Medical Publishers
4	Bontrager's Textbook of Radiographic Positioning and Related Anatomy	John Lampignano), Leslie E. Kendrick	Mosby

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Program: BMRIT

Semester: III

Subject: Clinical Radiography Positioning – II Lab.

Code: 42BBMRIT019

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Describe dental and upper respiratory radiographic procedures.

CO2: Perform thoracic and abdominal radiographic positioning and image assessment.

CO3: Demonstrate ward radiography, mammography, and radiation protection practices.

CO4: Operate C-arm and operation theatre radiographic equipment safely.

CO5: Analyze neonatal, pediatric, and forensic radiographic techniques.

CO6: Evaluate special radiographic techniques for optimal image quality.

CO7: Develop appropriate scatter control and foreign body localization techniques.

Course Content: Clinical Radiography Positioning – II Lab.

Topics and contents	Hours
UNIT– I: Dental and Upper Respiratory Radiography	20
Demonstration of dental radiography Positioning for upper respiratory system imaging Image evaluation	
UNIT – II: Thoracic and Abdominal Radiography	20
Radiography of lungs and mediastinum Radiography of abdominal viscera Patient positioning and image assessment	
UNIT – III: Ward Radiography & Mammography	20
Bedside/ward radiography procedures Mammography positioning techniques Radiation protection practices	
UNIT – IV: Operation Theatre & C-Arm Techniques	20
Operation theatre radiography C-arm positioning and operation Safety precautions during procedures	
UNIT– V: Neonatal, Pediatric & Forensic Radiography	10
Neonatal radiographic procedures Pediatric positioning techniques Forensic radiography Microradiography demonstration	
UNIT– VI: Special Radiographic Techniques	
Soft tissue radiography Multiple radiography techniques High kV radiography Radiographic factors and applications	10
UNIT – VII: Scatter Control & Foreign Body Localization	
Beam collimation techniques Grid ratio and grid movement Scatter radiation elimination Localization of foreign bodies	8

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Radiological positioning	Merils	Mosby
2	A guide to radiological positioning	Clarks	CBS publishers and Distributor's pvt. Ltd
3	Radiology Of Positioning And Applied Anatomy For Students And Practitioners	GarkalGs	Jaypee Brothers Medical Publishers
4	Bontrager's Textbook of Radiographic Positioning and Related Anatomy	John Lampignano), Leslie E. Kendrick	Mosby

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Program: BMRIT

Semester: III

Subject: Radiography and Image Processing Techniques

Code: 42BBMRIT020

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Describe radiographic films, intensifying screens, and X-ray cassettes.

CO2: Explain dark room planning, film processing, and daylight film handling techniques.

CO3: Apply photographic principles to obtain quality radiographic images.

CO4: Analyze factors affecting radiographic image quality and resolution.

CO5: Evaluate imaging systems and radiographic techniques for effective image management.

Course Content: Radiography and Image Processing Techniques

Topics and contents	Hours
UNIT – I: Photographic Principles	20
Radiographic film- construction and types; Photographic effect and latent image formation; Film density and log relative exposure; Characteristic curve – its formation and features; Spectral response; Film faults and Artifacts Intensifying Screens: Luminescence-fluorescence and phosphorescence; Construction and types of Intensifying Screens; Intensification Factor, quantum detection and conversion efficiency; Film screen matching; Resolving power of Intensifying Screens; Speed of intensifying screen; Screen film contact tests; Advantages and limitations of Intensifying Screens X-ray Cassette: Construction of X-ray cassettes; Types of cassettes; Mounting Intensifying Screens on cassettes; Care and maintenance of cassettes	
UNIT – II: Dark Room – Planning & Construction	15
Planning for a small & large Hospital; Location of Dark Room; Construction of Dark Room; Ventilation; Wall Protection; Entrance to Dark Room - Single Door, Double Door, Labyrinth Dark Room Accessories: Dry bench; Hopper, Drawer, Cupboard; Loading and unloading cassettes; Hangers, types of hangers and storage of hangers; Wet bench; Cleanliness, control of dust, dark room sinks; Hatches; Drier; Safe Lights-types and uses, factors affecting safelight performance, safelight Tests; Viewing room, Film dispensing	
UNIT– III: Film Processing: Photochemistry	15
Developer; Rinsing; Fixer; Washing and drying; Preparation of processing solutions; Manual processing apparatus; Effect of temperature in processing; Rapid processing Automatic processor: Principle of working and features, thermal regulation and replenishment system; Care and maintenance of automatic processor; Advantages and limitations of automatic processor	
UNIT – IV: Day Light Film handling; Xeroradiography, Stereoscopy	5
Day Light Film handling; Xeroradiography, Stereoscopy	
UNIT – V: The Radiographic Image	15
The emergent beam related to densities on film contrast – objective and subjective Radiation contrast, film contrast and Radiographic contrast- Density, Sharpness, Unsharpness Resolution: Factors affecting resolution, choice of Kilovolt age and Mill amperage, Choice of Short Focus and Broad Focus, selection of Focus to Film Distance and Object to Film Distance selection of cassettes, Avoiding scatter radiation, magnification, distortion, penumbra Reproduction of Radiographs: Copying Radiographs, Magnification and Minification Radiography Imaging Communication: Hospital Information System, Radiology Information System, PACS, DICOM	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Radiographic Imaging (Cbs)I.C.R.P.	D.N. Chesney & M.O Chesney	Blackwell Scientific
2	An Introduction Of Physics to Diagnostic Radiography	Christensen, Curry & Dowdey	Lea & Febiger

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Program: BMRIT

Semester: III

Subject: Radiography and Image Processing Techniques Lab.

Code: 42BBMRIT021

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Identify radiographic films, intensifying screens, and X-ray cassettes.

CO2: Perform darkroom procedures and manual film processing techniques.

CO3: Examine radiographic density, contrast, and image quality parameters.

CO4: Assess image resolution and reproduce radiographs for quality evaluation.

Course Content: Radiography and Image Processing Techniques

Topics and contents	Hours
UNIT – I: Radiographic Image Receptors	20
Identification and handling of radiographic films.	
Identification and handling of intensifying screens.	
Loading and unloading of X-ray cassettes.	
UNIT – II: Darkroom Design and Processing	6
Demonstration of darkroom planning and construction.	
Manual film processing.	
Preparation and use of processing chemicals.	
Study of photochemical reactions during film processing.	
UNIT– III: Radiographic Image Quality	5
Evaluation of radiographic density.	
Demonstration of radiation, film, and radiographic contrast.	
Observation of the effect of the emergent beam on image density.	
UNIT – IV: Image Resolution and Reproduction	5
Assessment of image sharpness and unharness.	
Demonstration of factors affecting image resolution.	
Evaluation and reproduction of radiographs.	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Radiological Science for technologists	Stewart C. Bushong	Mosby
2	A Concise Guide on Basic Radiographic Physics Darkroom Procedures, Radiographic Positioning & Techniques	Lalit Agarwal	JBD Publications

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Program: BMRIT

Semester: III

Subject: Contrast and Special Radiological Procedures

Code: 42BBMRIT022

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Discuss special radiographic procedures, contrast media, and patient preparation for contrast studies.

CO2: Execute standard protocols for gastrointestinal, hepatobiliary, genitourinary, and reproductive imaging procedures.

CO3: Investigate neuroradiological and advanced contrast imaging procedures.

CO4: Recommend appropriate special radiographic procedures based on clinical indications.

Course Content: Contrast and Special Radiological Procedures

Topics and contents	Hours
UNIT – I: Special Radiographic Procedures	10
Introduction: General approach to Special Radiographic procedures, Responsibility of Radiology Technologist during radiological procedures, Preparation of patient for different procedures, Room layout in interventional radiology and fluoroscopy.	
Contrast Media: Positive and Negative, Ionic & Non Ionic, Adverse Reactions to contrast media and patient management.	
Emergency Equipment in the Radiology Department	
UNIT – II: GIT and Hepatobiliary Imaging	20
Gastro Intestinal Tract: Barium Swallow; Barium Meal - Single and Double Contrast; Barium Meal Follow Through; Small Bowel Enema (Enteroclysis); Barium Enema - Gastrograffin Enema; Loopogram	
Biliary Tract: Oral & Intravenous Cholecystography; Percutaneous Transhepatic Cholangiography; Percutaneous Transhepatic Biliary Drainage; Endoscopic Retrograde Cholangiopancreatography	
UNIT– III: Genitourinary and Reproductive Imaging	20
Urinary System: IVU (Intravenous Urography), Retrograde Pyeloureterography (RGU), Micturating Cysto Urethrography, Ascending Urethrography	
Reproductive System: HysteroSalpingogram, FTR (Fallopian Tube Recanalization)	
MODULE – IV: Neuroradiology and Advanced Contrast Studies	20
Central Nervous System: Cervical Myelography - Cisternal Puncture and Lateral Cervical Puncture, Lumbar Myelography, Myelography with water soluble and oily contrast media	
Respiratory System: Bronchography, Percutaneous Lung Biopsy Other procedures in radiology: Arthrography, Sialography, Lymphography, Sinography & Fistulography, Dacryocystography, Embolization & embolic agents	

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1	Radiographic Imaging (Cbs) I.C.R.P.	Bhushan and Lakkhar	Arya Publications
2	A guide to radiological procedures	Chapman	Elsevier

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Program: BMRIT

Semester: III

Subject: Contrast and Special Radiological Procedures Lab.

Code: 42BBMRIT023

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Demonstrate patient preparation and contrast media procedures for special radiographic examinations.

CO2: Perform gastrointestinal, biliary, urinary, and reproductive radiographic procedures.

CO3: Examine CNS and respiratory system radiographic procedures and image quality.

CO4: Assess radiographic findings and patient safety during special procedures.

Course Content: Contrast and Special Radiological Procedures Lab.

Topics and contents	Hours
UNIT – I: Special Procedures & Contrast Media	25
Demonstration of special radiographic procedures Role and responsibilities of radiology technologist Preparation of patients for contrast examinations Observation of contrast media administration Management of adverse reactions to contrast media	
UNIT – II: Gastrointestinal & Biliary Procedures	29
Demonstration of barium swallow procedures Demonstration of barium meal and follow-through studies Observation of barium enema procedures Demonstration of biliary tract investigations Patient positioning and image evaluation	
UNIT– III: Urinary & Reproductive System Procedures	29
Demonstration of urinary tract contrast studies Observation of urographic procedures Demonstration of reproductive system investigations Patient preparation and positioning Image assessment and documentation	
MODULE – IV: CNS & Respiratory System Procedures	25
Demonstration of central nervous system investigations Observation of respiratory system contrast procedures Patient care during special examinations Radiation safety during procedures Evaluation of radiographic images	

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1	Radiographic Imaging (Cbs)I.C.R.P.	Bhushan and Lakkhar	Arya Publications
2	A guide to radiological procedures	Chapman	Elsevier

SEMESTER – IV

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Program: BMRIT

Semester: IV

Subject: Cross Sectional Anatomy

Code: 42BBMRIT024

Course Outcome:

On completion of the Course, the students will be able to:

CO 1: Interpret sectional anatomy and anatomical terminology.

CO 2: Illustrate normal and abnormal CT/MRI anatomy of the thorax, abdomen, pelvis, brain, spine, and neck.

CO 3: Analyse CT/MRI sectional images for anatomical correlation.

Course Content: Cross Sectional Anatomy

Topics and contents	Hours
UNIT – I: Introduction to Sectional Anatomy & Terminology-	12
Sectional planes, Anatomical relationships/terminology Anatomy of the upper thorax-Surface anatomy relationships, Bony structures and muscles, Blood vessels. Divisions of the mid-thorax, heart and great vessels-Lungs, heart and great vessels, Esophagus	
UNIT – II: CT/MRI Anatomy of Thorax, Abdomen & Pelvis	12
CT/MRI Images of the Thorax - Normal and abnormal imaging Anatomy of the Abdomen- Major organs and their accessories, Abdominal blood vessels CT/MR Images of Abdomen – Normal and pathologic anatomy of the Pelvis- Bony structures and associated muscles, Digestive and urinary systems Reproductive Organs - Normal and abnormal imaging	
UNIT – III: CT/MRI Neuroanatomical and Neck Imaging	12
CT/MR Images of the Male/Female Pelvis- Normal and pathologic Neuro Anatomy-Scan planes Brain –Cerebral hemispheres, Sinuses, Ventricles, Brainstem and associated parts, Arterial/venous systems, Basal ganglia, Cranial nerves Spine- Vertebra and disc, Spinal cord and meninges Neck-Arterial/venous systems, Muscles, Glands and pharynx	

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1	Cross Sectional Anatomy CT & MR	G Bhavin Jhankaria	Jaypee Brothers Medical Publishers;
2	Step by step Cross-sectional Anatomy	D Karthikeyan	Jaypee brother medical publishers

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Program: BMRIT

Semester: IV

Subject: Cross Sectional Anatomy Lab.

Code: 42BBMRIT025

Course Outcome:

On completion of the Course, the students will be able to:

CO 1: Outline sectional anatomy and anatomical terminology.

CO 2: Interpret CT/MRI anatomy of the thorax, abdomen, pelvis, brain, spine, and neck.

CO 3: Examine CT/MRI sectional images for anatomical correlation.

Course Content: Cross Sectional Anatomy Lab.

Topics and contents	Hours
UNIT – I: Introduction to Sectional Anatomy & Terminology-	36
Sectional planes, Anatomical relationships/terminology Anatomy of the upper thorax-Surface anatomy relationships, Bony structures and muscles, Blood vessels. Divisions of the mid-thorax, heart and great vessels-Lungs, heart and great vessels, Esophagus	
UNIT – II: CT/MRI Anatomy of Thorax, Abdomen & Pelvis	36
CT/MRI Images of the Thorax - Normal and abnormal imaging Anatomy of the Abdomen- Major organs and their accessories, Abdominal blood vessels CT/MR Images of Abdomen – Normal and pathologic anatomy of the Pelvis- Bony structures and associated muscles, Digestive and urinary systems Reproductive Organs - Normal and abnormal imaging	
UNIT – III: CT/MRI Neuroanatomical and Neck Imaging	36
CT/MR Images of the Male/Female Pelvis- Normal and pathologic Neuro Anatomy-Scan planes Brain –Cerebral hemispheres, Sinuses, Ventricles, Brainstem and associated parts, Arterial/venous systems, Basal ganglia, Cranial nerves Spine- Vertebra and disc, Spinal cord and meninges Neck-Arterial/venous systems, Muscles, Glands and pharynx	

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1	Atlas of Cross Sectional Anatomy and Radiological Imaging	Dr David J. Jackowe	Anshan Ltd
2	Fundamentals of Sectional Anatomy: An Imaging Approach	Denise L. Lazo	Cengage Learning

Program: BMRIT

Semester: IV

Subject: Modern Radiological Imaging Equipment and Physics

Code: 42BBMRIT026

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Course Outcome:

On completion of the Course, the students will be able to:

CO 1: Explain modern X-ray imaging systems and digital radiography technologies.

CO 2: Illustrate the principles of computed radiography, digital radiography, and dental imaging.

CO 3: Investigate the applications of advanced imaging systems in clinical practice.

CO 4: Assess the role of PACS, RIS, HIS, and digital imaging technologies in healthcare.

Course Content: Modern Radiological Imaging Equipment and Physics

Topics and contents	Hours
UNIT – I: Modern X-ray Imaging Systems	9
Modern x-ray tube. Digital Mammography and Tomosynthesis, Stitch radiography, Dual energy x-ray absorptionmetry (DEXA) scan.	
UNIT – II: Computed & Digital Radiography	9
Computed radiography: its principle, physics & equipment. Digital Radiography: its principle, physics & equipment. Flat panel digital fluoroscopy and radiography system, Direct and indirect digital radiography and fluoroscopy systems. Digital radiography and Computed radiography its advantages, disadvantages and applications. Digital Portable and mobile x-ray units	
UNIT – III: Advanced Dental Imaging	9
Modern dental equipments. Cone beam dental CT.	
UNIT – IV: Medical Imaging Informatics	9
Picture archiving and communication system (PACS), RIS and HIS.	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Textbook of Radiology: Physics	Amol Sasane, Hariqbal Singh , Roshan Lodha	Jaypee Brothers Medical Publishers
2	The Physics Of Radiology And Imaging	THAYALAN K	Jaypee Brothers Medical Publishers
3	Christensen's Physics of Diagnostic Radiology	Thomas S. Curry, James E. Dowdey, Robert E. Murry	Lea & Febiger,U.S

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Program: BMRIT

Semester: IV

Subject: Modern Radiological Imaging Equipment and Physics Lab.

Code: 42BBMRIT027

Course Outcome:

On completion of the Course, the students will be able to:

CO 1: Explain modern X-ray imaging systems and digital radiography technologies.

CO 2: Illustrate the principles of computed radiography, digital radiography, and dental imaging.

CO 3: Investigate the applications of advanced imaging systems in clinical practice.

CO 4: Assess the role of PACS, RIS, HIS, and digital imaging technologies in healthcare.

Course Content: Modern Radiological Imaging Equipment and Physics Lab.

Topics and contents	Hours
UNIT – I: Modern X-ray Imaging Systems	9
Modern x-ray tube. Digital Mammography and Tomosynthesis, Stitch radiography, Dual energy x-ray absorptionmetry (DEXA) scan.	
UNIT – II: Computed & Digital Radiography	9
Computed radiography: its principle, physics & equipment. Digital Radiography: its principle, physics & equipment. Flat panel digital fluoroscopy and radiography system, Direct and indirect digital radiography and fluoroscopy systems. Digital radiography and Computed radiography its advantages, disadvantages and applications. Digital Portable and mobile x-ray units	
UNIT – III: Advanced Dental Imaging	9
Modern dental equipments. Cone beam dental CT.	
UNIT – IV: Medical Imaging Informatics	9
Picture archiving and communication system (PACS), RIS and HIS.	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Textbook Of Radiology For Residents And Technicians	BHARGAVA S. K (Author	CBS; publishers
2	Concise Text Book on Imaging Modalities & Recent Advances In Diagnostic Radiology	Lalit Agarwal, Dr. K.B. Gehlot	JBD Publications

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Program: BMRIT

Semester: IV

Subject: Interventional Radiology Techniques

Code: 42BBMRIT028

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Explain the principles of DSA and angiographic equipment.

CO2: Demonstrate interventional radiology techniques and catheterization procedures.

CO3: Interpret angiographic and venographic procedures.

CO4: Examine radiation safety practices in the angiography suite.

CO5: Assess equipment maintenance and quality assurance in angiography.

Course Content: Interventional Radiology Techniques

Topics and contents	Hours
UNIT – I: Introduction to interventional procedures	15
DSA: basic principles and types Equipment: Basics of angiographic equipment, single and biplane angiographic equipments, angiographic table, image intensifier, flat panel detectors, recording systems, pulse oximetry, cardiac resuscitation measure-ECG, pressure injector, catheters, needle and other tools, 3D rotational angiography, image processing, patient monitor, CO2 angiography	
UNIT – II: Interventional Radiology Techniques	20
Interventional procedures: Catheter- classification, types and applications, Guide wire-classification, types and applications, Pressure Injector and Accessories, Percutaneous catheterization, Digital Subtraction Angiography, Catheterization Sites, Asepsis	
UNIT – III: Angiography and Venography	20
Arteriography: Head and Neck Arteriography, Pulmonary Arteriography, Coronary Arteriography, Ascending Aortography, Trans Lumbar Aortography, Renal Arteriography, Trans Femoral Arteriography Venography: Peripheral Venography- Lower Limb, Upper Limb, Central Venography, Superior Venacavography, Inferior Venacavography, Pelvic Venography	
UNIT – IV: Angiography Safety and Radiation Protection	10
Safety considerations in angiography room; room design, protective devices, radiation monitoring	
UNIT – V: Equipment Maintenance and Quality Assurance	5
Care and maintenance tests: General care, functional test Quality assurance program: Acceptable limits of variation, corrective action	

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1	The practice of interventional radiology	Karim valji	
2	Interventional radiology: a survival guide	EBIR Kessel, David, Robertson, Iain	Elsevier Health Sciences
3	Handbook of Interventional Radiologic Procedures	Krishna kandarpa, lindsay machan, janettedurham	Lippincott Williams and Wilkins

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Program: BMRT

Semester: IV

Subject: Interventional Radiology Techniques Lab.

Code: 42BBMRIT029

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Demonstrate the operation of angiographic equipment and accessories.

CO2: Perform catheter handling and assist in angiographic procedures.

CO3: Analyse arteriography and venography procedures for appropriate patient care.

CO4: Evaluate radiation safety practices and quality assurance in angiography.

Course Content: Interventional Radiology Techniques Lab.

Topics and contents	Hours
UNIT – I: Angiographic Equipment and Accessories	18
Demonstration of angiographic equipment and its components. Identification and handling of angiography table, C-arm, image intensifier/flat panel detector, pressure injector, and accessories. Basic operation of angiographic equipment.	
UNIT – II: Catheters and Guide Wires	18
Identification and classification of catheters and guide wires. Handling techniques and selection of catheters for different procedures. Preparation of accessories used during angiographic procedures. Demonstration of aseptic techniques in catheterization.	
UNIT – III: Arteriography and Venography Procedures	18
Observation and demonstration of arteriography procedures. Observation and demonstration of venography procedures. Patient preparation, positioning, and assistance during angiographic examinations. Image acquisition and post-procedure patient care.	
UNIT – IV: Angiography Room Safety and Quality Assurance	18
Radiation protection practices in the angiography room. Use of personal protective devices and radiation monitoring devices. Routine care and maintenance of angiographic equipment. Demonstration of quality assurance tests and equipment safety checks.	

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1	Interventional Radiology: A Survival Guide	David Kessel , Iain Robertson	sevier Health Sciences
2	A Guide on Special Radiographic Investigations & Techniques	Lalit Agarwal	JBD Publications

Program: BMRIT

Semester: IV

Subject: Patient Care in radiology

Code: 42BBMRIT030

L	T	P	C
1	1	0	2

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Recall the roles and responsibilities of a medical imaging technologist.

CO2: Explain patient care, communication, and hospital procedures in radiology.

CO3: Demonstrate nursing procedures and basic first aid techniques.

CO4: Apply infection control practices and patient care during radiological investigations.

CO5: Analyze patient management during radiological procedures.

CO6: Assess the safe use and storage of drugs and medical records in radiology.

CO7: Recommend ethical and medico-legal practices in patient care.

Course Patient Care in radiology

Topics and contents	Hours
UNIT – I: Patient Care and Communication	3
Introduction to Patient Care: Responsibilities of Medical Imaging Technologist, Obtaining Consents and history for different radiological examinations, Patient transfer and Restraining techniques, Obtaining vital signs, Ergonomics and body mechanism Communication: Patient education, Communication with the patient, Professional role and behavior	
UNIT – II: Hospital Organization and Departmental Procedures	3
Hospital procedure: Hospital staffing and organization; records relating to patients and departmental statistics; professional attitude of the technologist to patients and other members of the staff; medico- legal aspects; accidents in the departments, appointments, organization; minimizing waiting time; out-patient and follow-up clinics; stock-taking and stock keeping.	
UNIT – III: Patient Care and Hygiene	3
Care of the patient: FIRST contact with patients in the department; management of chair and stretcher patients and aids for this, management of the unconscious patient; elementary hygiene; personal cleanliness; hygiene in relation to patients.	
UNIT– IV: Nursing Procedures and First Aid	3
Nursing procedures in Radiology: Injection- methods and their routes of administration, Clothing of patient, Administering rectal enema. First aid: Aims and objectives of first aid; wounds and bleeding, dressing and bandages; pressure and splints, supports etc. Shock; insensibility; asphyxia; convulsions; resuscitation, use of suction apparatus, drug reactions; prophylactic measures; administration of oxygen; electric shock; burns; scalds; hemorrhage; pressure points; compression band. Fractures; splints, bandaging; dressing, foreign bodies; poisons.	
UNIT – V: Patient Care in Radiological Investigations	3
Patient care in following investigations: GIT, Respiratory system, Cardiovascular system, CNS; Sterilization; Infection control Departmental procedures: Department staffing and organizations; records relating to patients and departmental statistics; professional attitudes of the technologist to patients and other members of the staff, medico-legal aspects accidents in the department; appointments; organisations; minimizing waiting time; out-patient and follow-up clinics; stock taking and stock keeping	
UNIT – VI: Drugs, Medical Ethics and Records	3
Drugs in the department and Storage: classification; labelling and checking, regulations regarding dangerous and other drugs; units of measurement, special drugs, anti-depressive, anti-hypertensive etc. crash cart. Medical ethics and records: Medico legal implication of MLC cases, Importance of consent, Consent in detail, Precaution while dealing with female patient, Medical records	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Patient care in radiography	Ruth Ann Ehrlich, Dawn M Coakes	Mosby
2	Concise Textbook on Hospital Management & Patient Care in Diagnostic Radiology	N.K.Kardam,, <u>Lalit Agarwal</u>	JBD Publications
3	Patient care in radiography: with an introduction to medical imaging	Ruth Ann Ehrlich and Joan A. daly	St. Louis, Mo. : Mosby Elsevier

L	T	P	C
0	0	4	2

Program: BMRIT

Semester: IV

Subject: Patient Care in radiology Lab.

Code: 42BBMRIT031

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Identify patient care techniques and communication practices.

CO2: Demonstrate hospital and departmental procedures in radiology.

CO3: Perform patient care and nursing procedures safely.

CO4: Implement infection control measures during radiological procedures.

CO5: Examine patient management during special radiological investigations.

CO6: Assess radiation safety and patient protection practices.

CO7: Recommend ethical practices and proper documentation in radiology.

Course Patient Care in radiology Lab.

Topics and contents	Hours
UNIT – I: Patient Care and Communication	10
Demonstration of patient reception, identification, and history taking. Obtaining informed consent and recording vital signs. Patient transfer and restraining techniques. Communication skills, patient education, and professional behavior.	
UNIT – II: Hospital Organization and Departmental Procedures	11
Observation of hospital staffing and departmental organization. Maintenance of patient records, departmental statistics, and appointments. Stock keeping and inventory management. Medico-legal aspects, departmental safety, and patient flow management.	
UNIT – III: Patient Care Techniques	10
Care of ambulatory, stretcher, wheelchair, and unconscious patients. Patient positioning and transportation techniques. Personal hygiene and patient hygiene practices. Safe handling of patients during radiological procedures.	
UNIT– IV: Nursing Procedures and First Aid	11
Demonstration of injection techniques, patient gowning, and rectal enema. Wound dressing, bandaging, splinting, and hemorrhage control. CPR, oxygen administration, suction apparatus, and management of emergencies. First aid for fractures, burns, electric shock, poisoning, and drug reactions.	
UNIT – V: Infection Control and Patient Care	10
Principles of asepsis, sterilization, and infection control. Biomedical waste management and standard precautions. Patient care during GIT, respiratory, cardiovascular, and CNS investigations.	
UNIT – VI: Patient Care in Special Investigations	10
Preparation and monitoring of patients during special radiological procedures. Post-procedure patient care and documentation. Radiation safety and patient protection practices.	
UNIT – VII: Drugs, Medical Ethics and Records	10
Identification, storage, and handling of drugs and crash cart. Maintenance of medical records and consent forms. Medico-legal documentation and ethical practices in radiology.	

REFERENCE BOOKS:

S.No.	Title of Book	Author	Publication
1	Introduction To Radiologic And Imaging Sciences And Patient Care	Adler A M	Elsevier
2	Concise Text Book on Hospital Management & Patient Care In Diagnostic Radiology	Lalit Agarwal , Dr. N.K. Kardam	JBD Publications

SEMESTER – V

Program: BMRIT

Semester: V

Subject: Basics Techniques in CT Technology

Code: 42BBMRIT032

L	T	P	C
4	1	0	5

Course Outcome:

On completion of the Course, the students will be able to:

CO 1: Describe the principles and instrumentation of CT.

CO 2: Explain CT image acquisition and reconstruction techniques.

CO 3: Apply CT protocols and contrast administration procedures.

CO 4: Analyse advanced CT technologies and imaging applications

CO 5: Evaluate CT safety, quality assurance, and professional practices.

Course Content: Basics Techniques in CT Technology

Topics and contents	Hours
UNIT – I: Introduction and history	20
CT principle, CT generations, CT Instrumentation, CT detectors, Axial & Helical CT – Slip ring technology	
UNIT – II: Data acquisition & Image pre- processing/reconstruction techniques	10
Algorithms for image reconstruction, Image display, Image post-processing techniques, CT artifacts, Image quality	
UNIT – III: CT Protocols for different body parts & Dental scan	15
CT Protocols for Angiography & Perfusion, CT contrast media and administration, CT guided interventional procedures	
UNIT – IV: Multi-detector CT	15
Isotropic imaging, Cardiac CT, Flash CT, Advanced CT scanners, Dual energy & Dual Source Scanners, CT-fluoroscopy	
UNIT – V: Safety consideration	10
Documentation in CT, Role of Medical Imaging technologist in CT scan procedures, Quality assurance in CT	

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1	Computed Tomography: Physical Principles, Clinical Applications, and Quality Control	Euclid Seeram RT(R) BSc MSc FCAMRT (Author)	Saunders
2	Computed Tomography for Technologists: A Comprehensive Text	<u>Lois Romans</u>	Lippincott Williams and Wilkins;
3	Computed Tomography: Physics and Technology. A Self Assessment Guide	Euclid Seeram	Wiley-Blackwell

Program: BMRIT

Semester: V

Subject: Basics Techniques in CT Technology Lab.

Code: 42BBMRIT033

L	T	P	C
0	0	8	4

Course Outcome:

On completion of the Course, the students will be able to:

CO 1: Identify the components and operation of a CT scanner.

CO 2: Demonstrate CT image reconstruction and post-processing techniques.

CO 3: Perform routine CT examination procedures and patient preparation.

CO 4: Analyse image quality and advanced CT imaging techniques.

CO 5: Evaluate quality assurance, radiation safety, and CT documentation practices.

Course Content: Basics Techniques in CT Technology Lab.

Topics and contents	Hours
UNIT – I: CT Scanner Familiarization	30
Identification of CT scanner components and accessories. Demonstration of CT scanner operation. Familiarization with axial and helical CT scanning. Observation of CT detectors and slip-ring technology.	
UNIT – II: Image Reconstruction	20
Performing image reconstruction and post-processing. Multiplanar image reformatting (MPR/MIP/VRT). Identification and correction of common CT artifacts.	
UNIT – III: CT Examination Procedures	54
Patient preparation and positioning for routine CT examinations. Performing standard CT protocols for different body parts and dental scans. Contrast media preparation and administration under supervision. Assisting in CT angiography, perfusion and CT-guided procedures.	
UNIT – IV: Advanced CT Techniques	20
Demonstration of Multi-Detector CT (MDCT). Protocol selection and scan parameter optimization. Evaluation of image quality in advanced CT examinations.	
UNIT – V: Quality Assurance and Safety	20
Radiation protection and patient safety practices. CT documentation and record maintenance. Routine quality control tests of CT equipment. Observation of the role of the Medical Imaging Technologist during CT procedures	

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1	The CT Handbook: Optimizing Protocols for Today's Feature-Rich Scanners	<u>Timothy P. Szczykutowicz</u>	Medical Physics Publishing Corporation
2	CT PROTOCOLS	Manjot Kaur, Maajid Mohi Ud Din Malik	JBD Publications

L	T	P	C
2	1	0	3

Program: BMRIT

Semester: V

Subject: Radiation Safety in Diagnostic Radiology

Code: 42BBMRIT034

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Identify the sources, quantities and units of radiation.

CO2: Interpret the biological effects of ionizing and non-ionizing radiation.

CO3: Demonstrate radiation detection and dosimeter techniques.

CO4: Differentiate radiation protection methods and dose optimization practices.

CO5: Justify appropriate radiation safety and shielding measures in diagnostic radiology.

Course Radiation Safety in Diagnostic Radiology

Topics and contents	Hours
UNIT – I: Radiation Basics	15
Radiation Quantities and Units: Radiation- Radioactivity- Sources of radiation - natural radioactive sources -cosmic rays terrestrial radiation - - man made radiation sources. Units of radiation - Quality factor - Flux-Fluence-Kerma- Exposure- Absorbed dose- Equivalent Dose- Weighting Factors-Effective Dose - Occupational Exposure Limits - Dose limits to public.	
UNIT – II: Radiation Biology	15
Biological Effects of radiation: Ionization, excitation and free radical formation, hydrolysis of water, action of radiation on cell-Chromosomal aberration and its application for the biological dosimetry- Effects of whole body and acute irradiation, dose fractionation, effects of ionizing radiation on each of major organ system including fetus -Somatic effects and hereditary effects-stochastic and deterministic effects-Acute exposure and chronic exposure-LD50 - factors affecting radio sensitivity. Biological effects of non-ionizing radiation like ultrasound, lasers, IR, UV and magnetic fields.	
UNIT – III: Radiation Detection & Dosimetry	15
Radiation detection and Measurements: Ionization of gases- Fluorescence and Phosphorescence - Effects on photographic emulsion. Ionization Chambers – proportional counters- G.M counters-scintillation detectors – liquid semiconductor detectors – Gamma ray spectrometer. Measuring systems – free air ionization chamber – thimble ion chamber – condenser chamber – Secondary standard dosimeters – film dosimeter – chemical dosimeter- Thermoluminescent Dosimeter. - Pocket dosimeter-Radiation survey meter- wide range survey meter -zone monitor-contamination monitor -their principle function and uses. Advantages & disadvantages of various detectors &its appropriateness of different detectors for different type of radiation measurement. Dose and Dosimetry, CT Dose Index (CTDI, etc.), Multiple Scan Average Dose (MSAD), Dose Length Product (DLP), Dose Profile, Effective Dose, Phantom Measurement Methods, Dose for Different Application Protocols, Technique Optimization. Dose area product in fluoroscopy and angiography systems, AGD in mammography Artificial Intelligence in Radiation Safety	
UNIT – IV: Radiation Protection	10
Radiation protection: Radiation protection of self and patient- Principles of radiation protection, time - distance and shielding, shielding - calculation and radiation survey –ALARA- personnel dosimeters (TLD and film batches) - occupational exposure.	
UNIT – V: Radiation Safety & Shielding	15
Radiation Hazard evaluation and control: Philosophy of Radiation protection, effects of time, Distance & Shielding. Calculation of Work load, weekly calculated dose to radiation worker & General public Good work practice in Diagnostic Radiology. Planning consideration for radiology, including Use factor, occupancy factors, and different shielding material.	

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1	Radiation Protection In Diagnostic X-Ray Imaging	Euclid Seeram, Patrick C. Brennan	Jones and Bartlett Publishers
2	Development of Radiation Protection in Diagnostic Radiology	Stewart C. Bushong	CRC Press Inc.,U.S.
3	Textbook of radiological Safety	Thayalan K	Jaypee Brothers Medical Publishers

Program: BMRIT

Semester: V

Subject: Radiation Safety in Diagnostic Radiology Lab.

Code: 42BBMRIT035

L	T	P	C
0	0	4	2

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Identify radiation quantities, units, and dose measurement methods.

CO2: Demonstrate the biological effects of radiation using practical observations.

CO3: Operate radiation detection instruments and personal dosimeters safely.

CO4: Examine radiation protection practices and ALARA principles during imaging procedures.

CO5: Assess radiation safety measures and documentation in diagnostic radiology.

Course Radiation Safety in Diagnostic Radiology Lab.

Topics and contents	Hours
UNIT – I: Radiation Units	15
Demonstration of radiation quantities and units. Measurement of exposure, absorbed dose and equivalent dose. Familiarization with radiation dose limits and unit conversions.	
UNIT – II: Radiation Biology	15
Demonstration of biological effects of ionizing radiation. Observation of radiation effects on cells and tissues. Study of radiation sensitivity and dose-response concepts.	
UNIT – III: Radiation Detection	15
Identification and handling of radiation detection instruments. Demonstration of survey meters and personal dosimeters (TLD/Film Badge). Measurement of background radiation levels. Demonstration of AI applications in radiation safety.	
UNIT – IV: Radiation Protection	15
Demonstration of radiation protection principles. Application of time, distance and shielding techniques. Practice of ALARA principles during imaging procedures.	
UNIT – V: Radiation Safety	12
Radiation hazard evaluation in diagnostic radiology. Observation of shielding arrangements and controlled areas. Documentation of radiation monitoring and safety practices.	

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1	Radiation Protection in Medical Radiography	Statkiewicz Sherer	Elsevier Health - US;
2	Basics of Radiation, Hazards and Prevention In Diagnostic Radiology	Prashant Kumar Jha	JBD Publications

Program: BMRIT

Semester: V

Subject: Quality Assurance in Diagnostic Radiology and Regulatory Requirements

Code: 42BBMRIT036

L	T	P	C
1	1	0	2

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Outline the principles and objectives of quality assurance in diagnostic imaging.

CO2: Classify quality control tests used for radiographic and imaging equipment.

CO3: Implement quality assurance procedures and routine equipment maintenance.

CO4: Differentiate regulatory standards and maintenance practices in diagnostic radiology.

CO5: Assess equipment performance and quality assurance programmes for safe imaging.

Course Content: Quality Assurance in Diagnostic Radiology and Regulatory Requirements

Topics and contents	Hours
UNIT – I: Quality Assurance Objectives of quality Control: Improve the quality of imaging thereby increasing the diagnostic value; to reduce the radiation exposure; Reduction of film wastage and repeat examination; to maintain the various diagnostic and imaging units at their optimal performance. Quality assurance activities: Equipment selection phase; Equipment installation and acceptance phase; Operational phase; Preventive maintenance. Quality assurance programme at the radiological faculty level: Responsibility; Purchase; Specifications; Acceptance; Routine testing; Evaluation of results of routine testing; Quality assurance practical exercise in the X ray generator and tube; Image receptors from processing; Radiographic equipment; Fluoroscopic equipment; Mammographic equipment; Conventional tomography; Computed tomography; Film processing, manual and automatic; Consideration for storage of film and chemicals; Faults tracing; Accuracy of imaging-image distortion for digital imaging devices. LASER printer calibration	4
UNIT – II: Quality Control Tests Filtration Contact between film and intensifying screen Contrast Verification of Optical and Radiation field congruence Beam alignment Focal spot size Linearity of tube current mA and Timer Applied potential HVT and total tube Resolution Grid alignment QA in mammography QA in CT QA in Digital Radiography	4
UNIT – III: Regulatory Standards National Regulatory Body Responsibilities and organization Safety Standards Codes and Guides Care and maintenance of diagnostic equipment: General principles and preventive maintenance for routine - daily, Weekly, monthly, quarterly, annually: care in use, special care of mobile equipment	4
UNIT – IV: Equipment Maintenance Responsibilities of licensees, registrants and employers Enforcement of Regulatory requirements Role of technologist in radiology department Maintenance and care of equipment: Safe operation of equipment; Routine cleaning of equipment and instruments; Cassette, screen maintenance; Maintenance of automatic processor and manual processing units; Routine maintenance of equipments; Record keeping and log book maintenance; Reject analysis and objectives of reject analysis programme.	3
UNIT – V: Preventive Maintenance Care and maintenance of diagnostic equipment: General principles and preventive maintenance for routine - daily, Weekly, monthly, quarterly, annually: care in use, special care of mobile equipment.	3

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
1	Quality Assurance and Control in Diagnostic Radiology and Imaging	Bhargava	CBS Publishers and Distributors
2	Quality Assurance	Dr. R. Sundhararajan, M.V.Kumudhavalli, Minal T. Harde	Thakur Publications Pvt Ltd

L	T	P	C
0	0	2	1

Program: BMRIT

Semester: V

Subject: Quality Assurance in Diagnostic Radiology and Regulatory Requirements Lab.

Code: 42BBMRIT037

Course Outcome:

On completion of the Course, the students will be able to:

CO1: Recognize quality assurance procedures and radiology equipment.

CO2: Demonstrate quality control tests for diagnostic imaging systems.

CO3: Perform routine quality assurance, documentation, and equipment maintenance.

CO4: Examine regulatory compliance and equipment management practices.

CO5: Recommend preventive maintenance and quality improvement measures for imaging equipment.

Course Content: Quality Assurance in Diagnostic Radiology and Regulatory Requirements Lab.

Topics and contents	Hours
UNIT – I: Quality Assurance	7
Observation of QA programme in a radiology department. Acceptance and routine quality assurance tests. QA of X-ray generator, tube and image receptors. LASER printer calibration and fault identification.	
UNIT – II: Quality Control Tests	8
Performance of quality control tests in diagnostic radiology. Beam alignment, collimation and filtration checks. Focal spot, timer and tube current accuracy tests. QA procedures for CT, mammography and digital radiography.	
UNIT – III: Regulatory Compliance	7
Demonstration of regulatory requirements in diagnostic radiology. Observation of safety standards, codes and documentation. Maintenance of quality assurance records.	
UNIT – IV: Equipment Management	7
Observation of responsibilities of licensees and employers. Routine equipment inspection and record keeping. Reject analysis and documentation of corrective actions.	
UNIT – V: Preventive Maintenance	7
Routine cleaning and maintenance of imaging equipment. Preventive maintenance schedules (daily, weekly, monthly, quarterly and annual). Care of mobile radiographic equipment and accessories.	

REFERENCE BOOKS:

S. No.	Title of Book	Author	Publication
3	Quality Assurance in Diagnostic Radiology	J. McLemore (Author	Imprint unknown
4	An Introduction to Quality Assurance in Radiology	Zafar Neyaz	BD Publications