COURSE TITLE: RADIOLOGY TECNIQUES –I & CLINICAL PRACTICE

		MARKS	
STUDY HOURS:	**60+160**	**THEORY**	**120**
PAPER:	**01**	**PRACTICAL:**	**30**
YEAR:	**2nd**	**TIME:**	**03HRS**

COURSE CONTENTS
STUDY HOURS

A. POSITIONING AND PROCEDURES

20+50

INTRODUCTION TO THE SUBJECT.

A1 Positions and procedures of x-ray for all bones of upper limbs, quantity of KV.Milliamp, seconds etc.

A2 Bones of vertebral columns their positions including focusing, position of patient, KV.milliamp and seconds required, distance from the tube etc.

A3 Bones of lower limbs including pelvis, their positions and KV, milliamp second required.

A4 Bones of thorax-positions and procedures for x-ray.

A5 Bones of neck and their positions.

A6 Digestive system-position, and procedures.

A7 Urinary system-position, procedure dyes and other medicines used to take x-rays dose required.

A8 Human reproductive system positions and procedure kV. Milliamp and second required.

A9 Skull-face, salivary glands, paranasal sinuses, their positions, procedure adopted.

A10 Ear, Mastoid, and Temporal Bones-position procedures.

A11 Respiratory system and heart

A12 ediatric Radiography.

A13 Flurscopy-positions and procedures-comparison and contrast with conventional radiography.

A14 Mamography.

A15 Myelography.

A16 Introduction to ultrasound, sonographic techniques, preparation and reassurance of patient.

A17 Conventional Tomography-Its principles & Techniques.

A18 Introduction to C.T.Scan.

A19 Isotope scamming-theory and practice.

A20 Magnetic resonance Imaging (MRI)- Introduction, CT scan, vis-à-vis Brain Spinal Cord.

A21 Angiography-Diagnostic and Interventiona

A22 Emergency Radiography.

A23 Radiography for foreign bodies.

A24 heater Radiography.

A25 Ward Radiography.
A26 Introduction to Lithotripsy.

B. X-RAY EQUIPMENT

20+50

B1 **Components and controls of X-Ray circuits:-**
High tension transformer-Rectification of high tension (Half and full wave)-kV control and indicators-Filament and control of tube current-Mill amperes indication-Mains voltage compensation-Main supply and the X- Ray set.

B2 **High tension generators:-**
Rating of X-Ray generators-self-rectified high tension full wave rectified circuit-circuit comparisons. Threephases full wave rectified circuit voltage waveforms are HT. generator constant potential circuit Failing load generators shared generator.

B3 **Fuses, Switches and Inter Locks:-**
Fuses, Switches, Circuit Breaker-interlocking circuits.

B4 **Exposure switches and exposure timers:-**
Switching system timing systems Exposure switching and its radiographic applications Choices of K.V. Contrast.

B5 **Logic'**
Binary counting system Logic elements Applications of logic circuits Radiographic timing and switching circuit.

B6 **X-Ray Tubes**
Construction of X-Ray Tubes Fixed anode X-Ray tube Rating anode- X-Ray tube Rating of X-Ray tube characteristics of X-Ray tubes Metal X-Ray tube X-Ray tubes for mammography choice of an x-Ray tube stands and tube support.
Filter-types and uses.
Choices of kV and contrast.
Tube diaphragms.
Collimation Nature, types methods and equipment.

B7 **Control of scattered Radiation:-**
Significance of scatter-Beam limiting devices beam centering devices the secondary radiation grid movements. Assessment of grid functions. Grids construction and operation.

B8 **Portable and Mobile X-Ray Equipment:-**
Main requirement-Portable x-ray equipment mobile x-ray equipment capacitor discharge mobile equipment cordless mobile equipment operating theatre x-ray equip.

B9 **Fluoroscopic**
Direct Fluoroscopy Fluoroscopic image.

B10 **Image intensifier.**
TV process x-ray image intensifier tube recording the intensified image panel type intensifier.

B11 **Intensifying screens Tomography Basic theory and equipment.**

C. RADIOLOGICAL ANATOMY 20+50

C1 Surface Anatomy
C2 Anatomy of upper Limbs
C3 Anatomy of lower Limbs including pelvis
C4 Anatomy of vertebral column.
C5 Anatomy of Thorax.
C6 Anatomy of Neck.
C7 Anatomy of urinary system.
C8 Anatomy of urinary system.
C9 Anatomy of male and female reproductive system.
C10 Anatomy of skull, face, salivary glands &paranasal sinuses
C11 Anatomy of ear, Mastoid & Temporal bone.

RECOMMENDED BOOKS:

1 Physics for radiology students by Dr. M. B Zaffar.
2 First year physics for radiographer by E. Hughes.
3 X-Ray equipment for students radiographers by BN & MO Chesney.
4 Medical X-Ray Techniques and diagnostic radiology by Ploat Publishers.
5 Merrilsallas on radiographic postion and radiological procedures vol I, II & III by Phillip W Belliager.

Reference books:

1 Text books radiology for residents and technicians by Satish K Bhargava.
2 X-Ray Diagnosis and imaging, Ultrasound, CT Scan, MRI and Radiosotope imaging.

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COURSE CONTENTS
STUDY HOURS

A. PRACTICAL LIST OF RADIOLOGICAL ANATOMY

20+50

A1 Introduction to regional anatomy
A2 Demonstration on anatomical Positions & plans
A3 Demonstration of Important Laval marks of head & neck
A4 Demonstrations o important landmark of thorax & abdomen.
A5 General demonstration of skeleton & types of bones
A6 Demonstration of skull bones
A6.1 Cranial bones
A6.2 Thoracic bones
A6.3 Fonaemineas& Striation passing through
A6.4 Anterior of Skull base

A7 Demonstration and vertebral columns
A7.1 Cervical V
A7.2 Thoracic VD7.3Lumbar V
A7.3 Sacral & Coccyx
A8 Demonstration on bones of upper limb.
A8.1 A typical rib
A8.2 Atypical rib
A8.3 Sternum
A9 Demonstration on bones of upper limb
A9.1 Clavicle
A9.2 Scapula
A9.3 Humerus
A9.4 Radius & Meta carpals
A10Demonstration on bones of lower limb
A10.1 Innominate bone
A10.2 Femur
A10.3 Tibia & Fibula
A10.4 Tarsals and meta tarsals
A11 Demonstration on different joints
A11.1 Fibrous joints
A11.2 Cartilaginous joints

A11.3 Synovial joints

A12 Circulatory system

Demonstration on heart as a pumping unit

A12.1 Right atrium Left ventricle

A12.2 Left ventricle

A12.3 Left atrium

A12.4 Left ventricle

A13 Demonstration on different system vessels

A13.1 Acute & its branches

A13.2 Veins & its tributaries

A14 Respiratory system

A14.1 Demonstration on the structure of nasal cavity

A14.2 Demonstration of structure of larynx & trachea

A14.3 Demonstration of structure of larynx & trachea

A14.4 Demonstration on structure of lung & bronchi

A15 Digestive system

A15.1 Demonstration on the different parts of oval cavity

A15.2 Demonstration on esophagus & stomach

A15.3 Demonstration on Small intestine large intestine rectum and anal cana

A16 Accessory Organ

A16.1 Demonstration on pancreas

A16.2 Demonstration on liver & gall bladder

A17 Urinary system

A17.1 Demonstration on the structure of both two kidney

A17.2 Demonstration on Ureters &Urinary bladder& Urethra

A18 Nervous system

A18.1 Demonstration on types of nervous

A18.2 25.Gross demonstration of different parts of brain

1) A18.3 26.Gross demonstration of spinal card
2) A18.4 27.Gross demonstration of cranial nerve
3) A18.5 28.Demonstration of Autonomic nerves system

B. PRACTICAL ACTIVITIES RADIOLOGY

40+120

B1 RADIOLOGY

B1.1 Introduction general requirements for radiology

B1.2 Characteristics of a radiograph regarding its size, shape position, density.

B1.3 Demonstration of radiographic positioning /movementsrelation ship and anatomic te

B1.4 Demonstration of different parts of X-ray medicine & how to clean them

B1.5 Demonstration of care of cassettes

B1.6 Demonstration for the uses of aseptic techniques while handling with the patients.
B1.7 Demonstration for the development of exposed films in the dark room
B1.8 Demonstration of general body planes/positions/body cavities/division of abdomen.
B1.9 Body demonstration of arterial terms
B1.10 Radiographic positioning terminology projection
B1.11 Terminology/ body movem**B2 UPPER EXTREMITY**

B2.1 Demonstration of different positioning of upper extremity e.g. of hand, wrist, fingers, carpal bones, femur, elbow humours

B2.2 Practical on shoulder projections e.g. axial projection AP,oblique, tangential
Clavicle PA &Paaxial views

B3 LOWER EXTREMITY

B3.1 Demonstration of different positioning of lower extremity e.g. foot, leg,thighs,

B3.2 Foot AP Lateral, medial projections etc.

B3.3 Ankle projections e.g. Ap Lateral oblique

B3.4 Leg projections e.g. AP Lateral oblique

B3.5 Knee projections AP, PA Lateral oblique

B3.6 femur projection PA, Lateral

B3.7 Pelvis & upper femur projection AP Lateral

B3.8 Pelvis & hip joints axial projections, AP Lateral PA, oblique views.

B3.9 Projections for vertebral column e.g. occipital cervical anticulabous (Open mouth)AP projection cranial, thorax lumbar & sacral vertebrae.

B4 CHEST

B4.1 Demonstration for positioning of trachea, lung & heart e.g. AP lateral oblique

B5 MOUTH & ABDOMEN

B5.1 Radiographic positioning for parietal and submaxillary glands.
B5.2 Demonstrations for routine procedures & Positions e.g. preparation of patients exposure techniques radiographic projections & radiation projections
B5.3 Biliary treat
cholengiography&Cholargiogram Procedure/Patient preparation /Preliminary diet/contraindications
B5.4 Demonstration for contrast studies of gastrointestinal tract e.g. barium meal & follow through, barium enema preparation for examining room preparation of patients radiation positioning, exposure term

B6 URINARY SYSTEM

B6.1 Demonstration on autography cystography, contrast used preparation of patient radiolgic procedure & protection measure

B7 SKULL

B7.1 Demonstration on lateral projections of cranium patient position/central hearing P.A.Projections AP full basal etcSellaturcica projection B7.2 Projection of nasal bones &para nasal sinuses.

B8 RADIATION PROTECTION

B8.1 Demonstration of different methods & shields used for radiation protection

B9 SPECIAL TECHNIQUES COMPUTED TOMAOGRAPHY

B9.1 Demonstrations for different equipments for tomography Machine its parts/positioning for tomography for different areas/immobilization techniques.

B9.2 General rules for Tomography and definition of terms

B10 MAMMOGRAPHY

B10.1 Demonstration of different positions/projections/definition of different terms.

B11 MYELOGRAPHY

B11.1 Demonstration of different media / preparation of room and patients/positions & projections for this procedure.

B12 MEGNETIC RESONANCE IMAGING

B12.1 Demonstration on equipment for MRI/instrument parameters /position for different regions.2

B13 ULTRASONOGRAPHY

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