



DIPLOMA IN RADIOLOGY AND MEDICAL IMAGING TECHNOLOGY

Course Name: Diploma in Radiology and Medical Imaging Technology

Duration: 1 Year

Eligibility: 10+2 in science stream with physics and chemistry as compulsory subject along with one of the math/biology.

DETAILED SYLLABUS

Semester I	Semester II
Human Anatomy - & Physiology	Clinical Radiography-Positioning
Radiology Physics, Radiation Physics & Physics Of Diagnostic Radiology	Equipments, basic Techniques of modern Imaging Modalities
X-Ray Machines & Accessories And Their Maintenance	Contrast & Special Radiography procedures
X-ray Film / Image processing Techniques	Quality Control in Radiology & Radiation Safety

SEMESTER I

PAPER 1: HUMAN ANATOMY - & PHYSIOLOGY

CONTENT:

Unit 1: Scope of Anatomy and Physiology - Definitions and Terms in Anatomy and Physiology- Structure and function of human cell - Elementary tissues of human body- Brief account on Composition of Blood - functions of blood elements - Blood Group and coagulation of blood.

Unit 2: Cardio Vascular System- Structure and functions of various parts of the heart, arterial and venous system, brief account on common cardiovascular disorders. Respiratory System- various parts of respiratory system and their functions, Physiology of Respiration.

Unit 3: Digestive System- names and various parts of digestive system-Liver, Spleen, Gall Bladder, Pancreas, Buccal Cavity, Pharynx, Oesophagus, Stomach, intestine etc.- physiology of digestion and absorption) Urinary System- various parts of urinary system and its function-structure and function of kidneys-physiology of urine formation - pathophysiology of renal disease and edema. Reproductive System- physiology and anatomy of Male & Female reproductive System-Prostate & Uterus & Ovaries etc.

Unit 4: Musculoskeletal System- Classification of bones & joints, structure of skeleton – structure of skeletal muscle – physiology of muscle contraction Nervous System- various parts of nervous system- Brain and its parts –functions of nervous system - Spinal Cord & Nerves.

Unit 5: Ear, Nose, Throat and Eye- Elementary knowledge of structure and functions of organs of taste, smell, hearing, vision. Endocrine System- Endocrine glands, their hormones and Functions-Thyroid, Parathyroid, Suprarenal, Pituitary, pituitary and Thymus.

Haemopoietic and Lymphatic System- Name of the blood vessels & lymph gland locations. Surface Anatomy & Surface Markings of Human Body.

Practical

- Study of Human Skeleton parts with skeletal models.
- Study with charts and models of all organ systems mentioned above.
- Microscopic slides examination of elementary human tissues, cells.

PAPER 2: RADIOLOGY PHYSICS, RADIATION PHYSICS & PHYSICS OF DIAGNOSTIC RADIOLOGY

CONTENT:

Unit 1: Basic concepts of power, work, force, energy, electricity, magnetism and their units and measurements, Einstein's formula, electromagnetic induction, Atomic structure, radioactivity, ionization and excitation, electromagnetic waves, X-rays production and properties, X-ray tube, quality of x-rays, factors affecting quality and intensity of x-rays.

Unit 2: X-ray circuits, interaction of X and gamma rays, X-radiation measurements etc. Principles of Radiation detection and measurements, TLD, Pocket Dosimeter, Radiation, Survey meter and radiation zone monitor.

Practical

- Study with charts, models & power point presentations Atomic structure, X-ray tubes, X-ray circuits involving students to present and discuss.

Suggested Readings

1. Anatomy and Physiology for Nurses – Evelyn. C. pearce
2. Anatomy and physiology for students - Senthil kumar
3. Physics for Radiography - Hay and Hughs
4. Radiographic latent image processing – W. E. J Mckinney
5. Anatomy and Physiology for students –Senthil kumar
6. Surface and Radiological Anatomy – Hamilton et al (Heffer)
7. Anatomy and Physiology for Radiographers- C.A. Werrick
8. Basic Radiological Physics – Thayalan
9. Care of patient in diagnostic Radiography – Chesney & Chesney.
10. Practical Nursing and First Aid – Ross and Wilson.
11. Radiographic Imaging - Derrick
12. Physics and photography principles of Medical Radiography – Seeman and Herman.
13. First Aid – Haugher and Gardner

PAPER 3: X-RAY MACHINES & ACCESSORIES AND THEIR MAINTENANCE

CONTENT:

Unit 1: X-ray machines, Anode & Cathode, Thermionic diode, X-ray valves and tubes, principle and practical aspects, semiconductors, triode valves, cathode ray

Unit 2: oscilloscopes, X-ray circuits, self rectifying circuits, half wave pulsating voltage, circuits, full valve pulsating voltage circuits, measurement of high voltage, control of KV circuit, mA circuit, X-ray beam quality

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PAPER 4: X-RAY FILM / IMAGE PROCESSING TECHNIQUES

CONTENT:

Unit 1: X-ray Films, X-ray cassettes, Intensifying screens X-ray films types, basic film structure & quality, choosing films for different studies, basics on hard copies of radiographic images, dry & wet processing, Fixer, Developer, film processing methods, manual and automatic processing

Unit 2: Conventional & modern image processing, rooms, image processing equipments, types & maintenance, day light systems, advantages & disadvantages, processing faults, glossy prints, paper prints etc., production of best quality images. Intensifying screen, Fluorescence, structure of Intensifying screens, Casette types, screen un-sharpness etc.

Practical

- X-ray Films- X-ray cassettes - Intensifying screens, other imaging hard copies, image processing equipments with demonstration.

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SEMESTER II

PAPER 1: CLINICAL RADIOGRAPHY-POSITIONING

CONTENT:

Unit 1: Radiological Equipments – X-ray machine - transformers, x-ray units, fluoroscopy, grids and filters - Positional Radiography - Radiographic views of different parts of the body – Chest, Abdomen, Upper Limb, Cervical & Thoracic Spine, Lumbar Spine

Unit 2: Sacrum & Coccyx, Bony thorax - Sternum & Ribs, Skull and cranial bones, facial bones, paranasal sinuses, Mastoids & Temporal bones etc. Upper & Lower GIT, Gall Bladder & Biliary duct, GUT etc.

Practical

- Radiographic positioning of all parts of the body.

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PAPER 2: EQUIPMENTS, BASIC TECHNIQUES OF MODERN IMAGING MODALITIES

CONTENT:

Unit 1: C.R (principle, equipment & imaging), Digital Radiography (principle, equipment & imaging), Mammography (basic principle, equipment & image acquisition)
CT (Basic physics – Tomography principle - basics of plain studies, contrast studies, special procedures)

Unit 2: MRI- basic principle, imaging methods, slice section, plain & contrast studies, image contrast, factors affecting image quality
USG- Basic acoustics, ultrasound terminologies, Interaction of US with matter, Ultrasound display modes etc.

Practical

- Demonstration of basic procedures in all modern modalities.

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PAPER 3: CONTRAST & SPECIAL RADIOGRAPHY PROCEDURES

CONTENT:

Unit 1: Barium swallow, barium meal, barium enema (single and double contrast), Enteroclysis

Unit 2: PTBD, Sinograms, Fistulograms, IVU, AUG, MCU, HSG, Sialogram, T-tube Cholangiogra, Fluroscopy, Image intensifiers, Tomography basics etc.

Practical

- Positioning and imaging of all kinds of contrast & special radiographic procedures

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PAPER 4: QUALITY CONTROL IN RADIOLOGY & RADIATION SAFETY

CONTENT:

Unit 1: Quality control procedure in Radiology as per NABH.

Unit 2: Biological effects of Radiation, Radiation dose, Effects of time, distance and shielding, personnel and area monitoring, Planning of X-ray rooms, dark rooms, Evaluation of workload versus radiation factors, Radiation safety instruments - ICRP / AERB recommendations.

Practical

- Radiation protection survey in diagnostic X-ray installations.

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