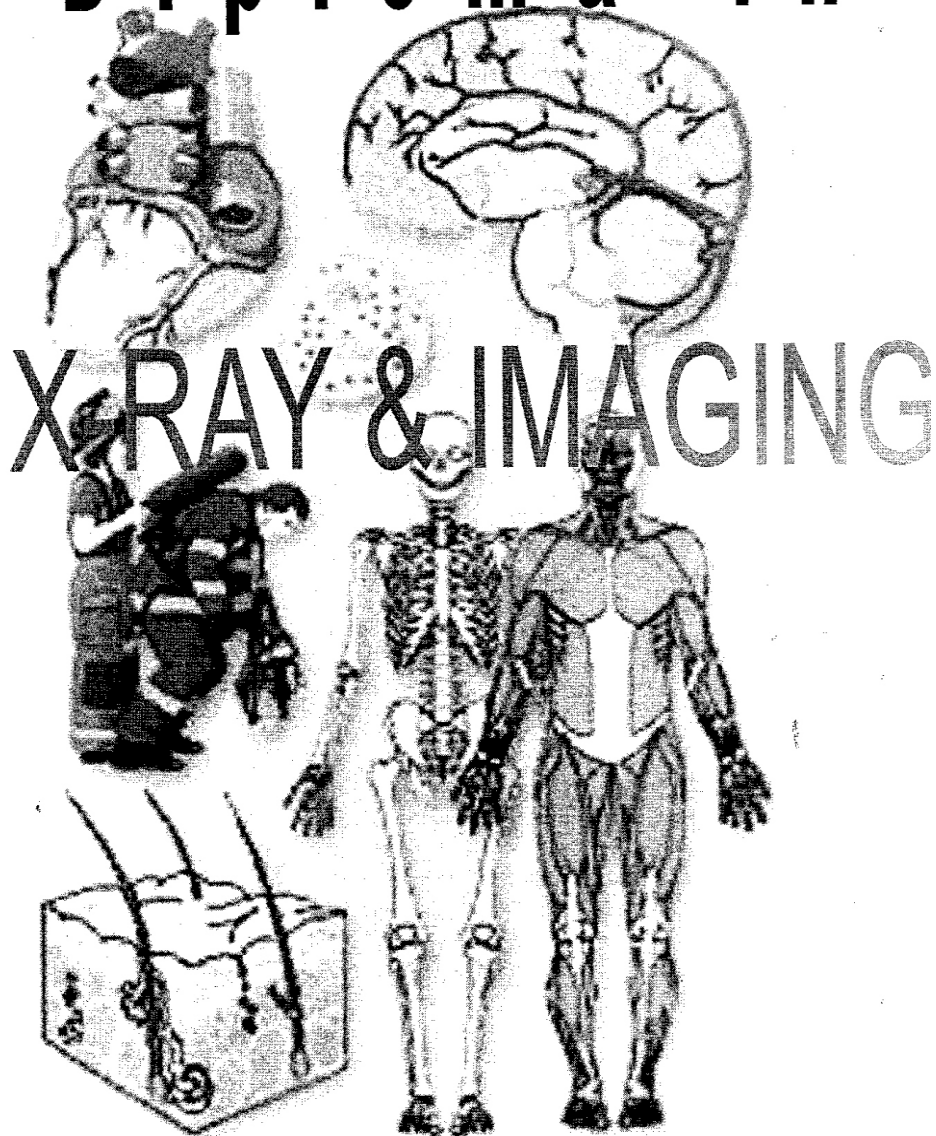


**D i p l o m a i n**



**INDIAN MEDICAL ASSOCIATION  
IMA HOUSE, I.P. MARG  
NEW DELHI - 110 002**

# DIPLOMA IN X-RAY & IMAGING TECHNOLOGY (DXIT)

## **Criteria**

- Admission
- Examination
- Passing

## **Outline Syllabus**

- Radiological Anatomy, Human Physiology & Biochemistry, Pathology including Clinical Pathology
- Dark Room Techniques, Radiographic Photography & X-Ray Physics
- Radiographic Techniques, Ultrasound, C T Techniques and Ultrasonography

## **Fee**

- Tuition Fee
- Registration Fee
- Examination Fee

# DIPLOMA IN X-RAY & IMAGING TECHNOLOGY (DXIT)

## ELIGIBILITY

- 1) Candidates who have passed 10 + 2 from any Board/ CBSE/ ICSE board or Pre- University examination with 40 % percent marks with science stream (Physics, Chemistry, Biology, Mathematics, Agriculture, etc.).
- 2) If science candidates are not available then the institutes may enrol students from any other stream with minimum of 50% of aggregate marks with an under taking/Affidavit from the students that they are fully aware that the Diploma may not be recognised by some of the State Governments and that they are undergoing the training on their own risk and will. Such an undertaking/Affidavit will have to be submitted to IMA at the time of enrolment of the candidates.
- 3) A candidate seeking admission to Diploma in Medical Laboratory Technology (DMLT) course should have 17 years of age, as on 31<sup>st</sup>, December of the year of admission. The candidate seeking admission in to Diploma courses should have attained 17 years of age as on 31<sup>ST</sup> December of the year of admission but not more than 25 years at the time of admission. Age relaxation of 5 years for SC/ST candidates and 3 years for OBC candidates is admissible.

## DURATION OF THE COURSE

The duration of the DXIT Courses shall be Two Years and there is no internship programme.

## MEDIUM OF INSTRUCTION

English shall be the medium of instruction for all the subjects of study and for the examination of DMLT Course.

## ATTENDANCE

A candidate is required to attend at least 75 percent of total classes conducted in year in all subjects prescribed for the year, separately, in theory and practical/clinical postings to become eligible to appear for the Institute examination. The Principals should notify at their college the attendance details at the end of each term without fail, under intimation to the Institute.

## SCHEDULE OF EXAMINATION

There will be two examination in a year, I) **July** and ii) **November**. Examination to be conducted as per notification issued by Paramedical Department, IM HQRs., New Delhi.

## EXAMINATION

There will be 3 Theory papers as under: -

1. **Paper - I** : Radiological Anatomy, Human Physiology & Biochemistry, Pathology  
**Paper - II** : Dark Room Techniques & X-Ray Physics  
**Paper - III** : Radiographic, Ultrasound, C T Techniques and Ultrasonography
2. The stress should be on techniques and skills
3. There should be Six Questions in each paper.

**TUTION FEE including Admission Fee (Excluding Enrolment & Examination Fee) is Rs. 30,000/- per year.**

**Rs. 2000/- Registration Fee and Rs. 3000/- Examination Fee per candidate.**

# **DIPLOMA IN X-RAY & IMAGING TECHNOLOGY (DXIT)**

## **CRITERIA FOR PASSING**

A candidate is declared passed in an examination in a subject, if he/she secures 40% of marks in theory and 40% in practical separately, will be placed in division as under :

- i) 75% : Distinction
- ii) 60-74.9% : I st Division
- iii) 50- 59.9 % : 2<sup>nd</sup> Division
- iii) 40-49.9% : Pass

## **SUPPLEMENTARY EXAM**

Candidate failing may take up supplementary examination to be held after 6 months.

## **GOVERNING BODY**

This will be the monitoring and governing body to run the course and to look after its different facets so that the course run by it is lucrative and useful in producing trained medical personnel's who are useful to the laboratories and who may earn livelihood by getting employment in prestigious laboratories.

Board will consist of :

1. Dean, IMA Paramedical courses
2. Chief Co-ordinator, IMA Para Medical Courses
3. One Radiologist (MBBS, M.D.)

IMA National President and Honorary Secretary General or their nominee will be permanent participant having voting power. Tenure of board should be two years.

# DIPLOMA IN X-RAY & IMAGING TECHNOLOGY (DXIT)

## ANATOMY AND PHYSIOLOGY

### Introduction

Structure of the body–cell –tissues.

### Surface Anatomy Skeletal system

Skull –vertebral column –shoulder girdle bones of upper lower extremities & pelvis.

### Joints

All kinds of joints, movements & function

### Muscles

All major muscles, origin, attachment, blood supply & nerve supply

### Circulatory System

Heart- Blood- Arteries-Veins, Hepatic & Renal Portal System

### Lymphatic System

All major lymph nodes and their drainage

### Digestive System

Mouth Stomach –Small Intestine- Large Intestine, Spleen- Liver- Gall bladder-Pancreas

### Respiratory System

Nose & Larynx-Trachea-Lungs-Metabolism

### Nervous System

Brain meninges-ventricles–spinal cord & nerves

### Reproduction System

Female-Male embryology

### Urinary System

Kidneys-uterus-bladder, Prostate

### Skin

Anatomy & Physiology

### Endocrine System

Pituitary gland –pineal gland-thymus gland –thyroid & Parathyroid glands

### Eye

Structure & Physiology

### Ear

Structure & Physiology

# **DIPLOMA IN X-RAY & IMAGING TECHNOLOGY (DXIT)**

## **COMPUTED TOMOGRAPHY**

### **Basic Principles**

- 1) General principle & definitions.
- 2) Changes & Advances.
- 3) Volume and Multi-slice scanners.
- 4) Principles of Image Reconstruction.
- 5) Computed Gray scale & CT numbers.
- 6) Slice thickness 7 table increments.
- 7) Pitch with helical scanners.
- 8) Attenuation & conversion of voxel to pixels.
- 9) Radiographic Anatomy

## **MAGNETIC RESONANCE IMAGING**

- 1) Definition & Introduction.
- 2) Physical Principles of MRI.
- 3) Comparison with radiography & CT.
- 4) MRI-components.
- 5) MRI process & Clinical applications.
- 6) MRI basic Safety.

## **RADIOTHERAPY**

- 1) Surface dose, air dose, given dose, Depth dose & charts.
- 2) Isodose charts & isodose charting.
- 3) Basic principles in radiotherapy with basic knowledge in Tele & brachy therapy treatment & planning.

## **ULTRASONOGRAPHY [USG]**

- 1) History
- 2) Introduction
- 3) Principles
- 4) Advantages and Limitations
- 5) Applications
- 6) USG imaging team

## **NUCLEAR MEDICINE**

- 1) Introduction.
- 2) Clinical applications.
- 3) Linear Accelerators.

## **CATH LAB**

- 1) Angiography Procedure
- 2) Cerebral, Thoracic, Angiocardiography, abdominal, peripheral angiographies & lymphography.
- 3) Angiographic equipment.
- 4) Interventional imaging procedures.
- 5) Purpose, Embolization.
- 6) Percutaneous transluminal Angiography [PTA] & stents implants & DAS.

# DIPLOMA IN X-RAY & IMAGING TECHNOLOGY (DXIT)

## PHYSICS

Units of measurement, Force, Work, Energy, Heat & Energy.

Various method of transmission of Heat.

### Magnetism

Classification of Magnets, Properties of Magnets, Magnetic Fields & lines of forces, Magnetic fields & their measurements, Electro Magnetism.

Electricity : Electrostatic-conductor & Insulators, Elementary electron theory, Units of electric charged potential. Condensers & capacity of condensers

Current electricity: Ohm's law, various units of current, Voltage & Resistance, heating effects of current units of Power & power consumption calculations, Principles of working of Moving coil & moving types of meters.

Electro magnetic induction: Transformers, their losses, rating Induction motors.

Direct & alternating currents: Impedance, capacitance & Inductance. Thermo ionic emissions & characteristic curve and diode & triode valve semi-conductors.

## RADIATION PHYSICS

- 1) Rectifications & various circuits.
- 2) Structure of Atom, Radioactivity- natural & artificial.
- 3) Production & Properties of X-rays.
- 4) X-ray tube in detail-stationary Anode, Rotating Anode & Radiotherapy tubes.
- 5) Interaction of radiation with matter.
- 6) Quantity and Quality of radiation & factors on which it depends H.V.T.
- 7) Dosimetry – various radiation measuring instruments.
- 8) I.C.R.P. recommendations.

## EQUIPMENT

Mains supply, Basic X-ray circuit control & stabilizing equipment meters, various exposure timers, control of scattered radiations Fluoroscopy, Tomography, mobile equipment, Photo-fluoroscopy, Memographic equipment. Image Intensifiers. Rapid Serial charger equipment. Care & maintenance of equipment.

# DIPLOMA IN X-RAY & IMAGING TECHNOLOGY (DXIT)

## RADIOGRAPHIC TECHNIQUE

### Upper Limb

Fingers Individual & as a whole, hands, carpal, tunnel, wrists, fore-arm, elbow, head of radius, humerus, shoulder joint, acromio-clavicular joint, scapular, clavicle, Sternoclavicular joint.

### Lower Limb

Toes, foot, calcaneus, ankle joint, leg, knees, patella, fibula, femur, intercondylar notch.

### Hip & Pelvis

Hip neck of femur-theatre procedure for hip pinning on reduction, pelvis, sacro-illiac joints, public bones, Acetabulum.

### Vertebral Column

Curves, postures, relative levels, atlanto-occipital region, adenoid, cervical spine, cervico-thoracic spine, dorsal spine, thoraco-lumbar spine, lumbo sacral spine, sacrum, coccyx, scoliosis, kyphosis, flexion & extension.

Bones of Thorax : Sternum, ribs.

### Skull

Land marks, Planes, cranium, facial bones, maxilla, mandible, zygomata, T.M. Joints, Mastoids, petrous-bones, optic foramen, sella turcica.

### Chest

Chest in teleradiography, chest supine & portable.

### Abdomen

Preparation indication & contra-indication, acute abdomen, pregnancy abdomen for multiplicity, maturity & Foetal abnormality, pelvimetry.

## SPECIAL PROCEDURES & THE USE OF CONTRAST MEDIA

### Urinary Tract

K.U.B. I.V.P – Retrograde-cysto-urethrography.

### Binary Tract

Oral cholecystography, I.V.C, Trans-hepatic, percutaneous cholangiography, Per operative Cholangiography, T.Tube Cholangiography, ERCP.

### Gastro-intestinal Tract

Ba-swallow, Ba-meal, Ba-Meal Follow through, Ba-enema.

### Hystero- salphigography

Investigation of uterus & tubes.



**RADIOGRAPHIC PHOTOGRAPHY & DARK ROOM TECHNIQUE**

**Photographic Process**

Light image-image produced by radiation –Light sensitive materials –Latent image.

**Film Material**

The structure of X-ray films- Resolving power - Graininess of film, Sensitivity of film, speed of film ,contrast of photographic films.

**Sensitivity**

Characteristic Curve & its usefulness.

**X- ray film storage**

Storage of unexposed films.

**Screens**

Construction of intensifying screens, Choice of Fluorescent material, Intensifying factor, Detail Sharpnes , Speed screen contact, Care of intensifying screens.

**Cassettes**

Cassette designs –Care of cassete , Mounting of intensifying screen in the cassette.

**Film processing**

Constituents of the processing solutions & replenisher. Factors affecting the developer, Types of developer & fixer , Factors affecting the use of the fixer, silver recovery methods

**Film Rinsing, washing & drying**

Intermediate rinse, Washing Drying.

**Film processing equipment**

Manual & Automatic processing.

**Dark Room Design**

Outlay & material used.

**The Radiographic image**

The sharpness, contrast, detail, definition, viewing conditions.

**Administration**

Trimming, Identification of films, legends, Relevant papers of the patients, record filling, reports distribution

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