CURRICULUM

2\textsuperscript{nd}, 3\textsuperscript{rd}, \& 4\textsuperscript{th} Semester

DIPLOMA COURSE

RADIOLOGY TECHNOLOGY

Bungalow No.86/D-5 Abdara Road University Town, Peshawar.
Phone No.091-9216008 Fax No 091-9218630
Website: www.kpmf.edu.pk Email: info@kpmf.edu.pk
2nd Semester

PHYSICS FOR RADIOLOGY TECHNICIANS.

- Concept of Radiation
- Fundamentals of Physics ------------ (related to radio physics)
- The Atom
- Electromagnetic Radiation
- Electricity and Magnets
- Electromagnetism
- Radiographic imaging (introduction only)
- X-Ray production
- X-Ray Emission
- X-Ray interaction with matter
- Radiographic films
- Processing the latent image

RADIOLOGICAL PROCEDURE

- General (Introduction)
- Intravenous contrast media
- Gastro intestinal tract---Barium Swallow, Barium Ba, ballow through Ba Eneima
- Biliary tract and pancreas --------- cholecystography, Cholangiograin, ERCP
- Urinary tract ----------- nephrogram, Uretherogram, Cystogram
Paper A Radio physics –I

Paper B Radiological Procedures-I

**RADIOLOGICAL POSITIONING & RELEVANT ANATOMY**

- Upper Limb
- The Shoulder
- Lower Limb
- Hip
- Vertebral Column
- Bones of Thorax

**RADIOLOGICAL PHYSICS**

**Concepts of Radiation:**

- Nature of our surroundings
- Source of ionizing radiation
- Discovery of X-Rays
- Development of modern radiology
- Radiation injury
- Radiation protection

**Fundamental of Physics:**

- Review of Mathematics
- Units of Measurement
- Mechanics
- Heat
The Atom

- Discovery
- Combination of atoms
- Fundamental Particles
- Atomic Structure (Fundamental Particles)
- Radio activity
- Ionizing radiation

Electromagnetic Radiation:

- Photons (radio logically important photons)

  Parses

- Magnetism

Electromagnetism:

- Electromagnetic effect
- Electromagnetic Induction
- Electric Generators Motors
- Transformers
- Rectification
Radiographic Imaging:
- X-Ray Machine
- X-Ray Tube
- Operation Console
- High voltage section

X-Ray Production:
- Electron target, interaction
- X-Ray Emission Spectrum
- Factors effecting the X-Ray emission spectrum
- X-Ray emission
- X-Ray quality

X-Ray Interaction with Matter:
- Five basic Interaction
- Deferential Absorption
- Contrast Examination

Radiographic Film:
- Film Construction
- Formation of latent image
- Types of Films
- Handling and storage of Films
Processing of Latent Image:

- Evolution of film processing
- Processing Chemistry
- Automatic Processing
- Alternative Processing method

Method of Teaching:

- Lectures
- Demonstrations
- Practical Work

Attendance:

- Every student has to attend 80% of the classes

Grading & Evaluation:

- There shall be 3 monthly tests of 20 Marks each, which shall be counted in the comprehensive exam in the end of semester. Passing Marks shall be 60%

Recommended Books:

- Radiological science for technologist (Stewart C.Bushong)
- Techniques is diagnostic radiology (G.H White House B.S Worthington)
- A Guide to radiological procedures (Stephenchampmanand)
- Radiological positioning (Kitty Clark)
- Atlas of radiological anatomy
- Altas of C.T/M.R Crossectional anatomy
3rd Semester

PHYSICS FOR RADIOLOGY TECHNICIANS.

Paper A Radio Physics –II

Paper B Radiological Procedures-II

- Intensifying Screens
- Beam restriction devices
- The Grid
- Radiographic quality
- Radiographic exposure
- Select plan film procedure
- Mammography
- Fluoroscopy
- Introduction to Computer Science
- Digital X-Ray imaging
- Computed Tomography
- Quality Control

RADIOLOGICAL PROCEDURE

- Reproductive System
- Respiratory System
- Arteriography
- Venography
- Angiocardiography
RADIOLOGICAL POSITIONING & RELEVANT ANATOMY

- The Skull
- Temporal Bones
- Para nasal Sinuses
- Fascial Bones
- Dental Radiography
- Skeletal System Survey
- Respiratory System & Heart

RADIOLOGICAL PHYSICS

1. **Intensifying Screens:**
   - Screen Construction
   - Luminescence
   - Screen Characteristic
   - Screen Film Combination
   - Care of Screen

2. **Beam Restricting Devices:**
   - Production of Scattered Radiation
   - Control Scattered Radiation
3. **The Grid:**
   - Control of Scatter Radiation
   - Characteristics of Grid Construction
   - Measuring Grid Performance
   - Types of Grid
   - Grid Selection

4. **Radiographic Quality:**
   - Film Factors
   - Geometric Factors
   - Subject Factors
   - Consideration for Improved Radiographic Quality

5. **Radiographic Exposure:**
   - Kilovolts Packs
   - Milliamps
   - Exposure Time
   - Mill ampere Seconds
   - Image Characteristics

6. **Select Plane Film Procedures:**
   - Tomography
   - Stereo Radiography
   - Magnification Radiography
7. **Mammography:**
   - Basic for Mammography
   - X-Ray Apparatus
   - Image Receptors
   - Xero Radiographic Process
   - Conclusion

8. **Fluoroscopy:**
   - Visual Consideration
   - Practical Fluoroscopic Technique
   - Image Intensification
   - Fluoroscopic Image Monitoring

9. **Introduction to Computer Science:**
   - History of Computer Science
   - Anatomy of a Computer
   - Computer Software
   - Processing Method

10. **Digital X-Ray Imaging:**
    - Digital Imaging
    - Digital Fluoroscopy
    - Digital Radiography
11. **Computed Tomography**
   - Principles of Operation
   - Operational Modes
   - System Component
   - Image Characteristics
   - Image Quality

12. **Quality Control:**
   - Radiographic Systems
   - Special X-Ray Systems
   - Photographic Procedures
   - Art defects
RADIOLOGICAL PROCEDURES

**Reproductive System:**
- Hystrosalpingography
- Gynaecography
- Vesiculography

**Respiratory System:**
- Nasopharyngography
- Larynogography
- Bronchography
- Preculaneous lung biopsy

**Anteriography:**
- Head, Neck arteriography
- Arlenography of the lower limb
- Cocliciac axis, superior mesenteric, inferior mesenteric arteriography
- Renal arteriography
- Vascular dialation
- Vascular occlusion
- Pulmonary arteriography

**Venography:**
- Central Venography
  - Superior Venacava Cavography
• Inferior Vena Cava Venography
• Pelvic Venography
• Ascending Lumbar Venography
• Intussusception Venography
• Portal Venography
• Transhepatic portal venous catheterization
• Selective retrograde Venography
• Renal Venography
• Adrenal Venography
• Hepatic Venography
• Internal Intercostal Venography
• Orbital Venography

➢ Peripheral Venography:
  • Lower Limb
  • Upper Limb

**Angiocardiology:**

➢ Equipment for an angiography room
➢ Introduction for Catheter Technique
➢ Pharmacological angiography
➢ Coronary arteriography
➢ Translumbar aortography
Methods of Teaching:

- Lectures
- Demonstrations
- Practical Work

Attendance:

- Every student has to attend 90% of the classes

Grading & Evaluation:

- There shall be 3 monthly tests of 20 marks each; which shall be held in the comprehensive exam in the end of semester. Passing marks will be 60%

Recommended Books:

- Radiological Science for Technologists (Stewart C Bushong)
- Techniques in diagnostic radiology (G. H White House, BS Worthington)
- A guide to radiological procedures (Stephen Chapman and)
- Radiological Positioning (Kitty Clark)
- Atlas of radiological anatomy
- Atlas of AC.T/M.R Cross-sectional anatomy
4th Semester

Paper A Radio Physics III

Paper B Radiological Procedures III

PHYSICS FOR RADIOLOGY TECHNICIANS

1. Physical Principles or MRI
2. Equipment with Images
3. Physical principles of Ultrasounds
4. Diagnostic Ultrasounds
5. Principles of Radiobiology
6. Molecular & Cellular Radiobiology
7. Early & Late effects of Radiation
8. Health Physics
9. Design for radiological image facilities
10. Design for radiological protection
11. Radiation protection procedures

RADIOLOGICAL PROCEDURE

1. Lymph Nodes & Lymphatic
2. Central Nervous System
3. Dacrocystography
4. Arthrography
5. Sialography
RADIOLOGICAL POSITIONING & RELEVANT ANATOMY

1. The Abdominal & Pelvic cavity
2. Foreign Bodies
3. Ward Radiography
4. Theater Radiography
5. Tomography
6. Macro Radiography
7. Stereo Radiography

RADIOLOGICAL PHYSICS

1. Physical Principles of MRI:
   - Why MRI
   - Fundamental Concepts
   - NMR Parameters
   - MRI Versus CT
   - Imaging Principles

2. MR Equipments with Images:
   - Imaging Managements
   - Secondary Coils
   - MR Images
   - Biology Hazards
3. **Physical Principles of Ultrasounds:**
   - Diagnostic Ultrasound
   - Acoustic Intensity & Power
   - Acoustic Reflection
   - Acoustic Absorption & attenuation

4. **Diagnostic Ultrasounds, Instrumentation & Operation:**
   - Ultrasound Transducer
   - Ultrasonic Beam
   - Operation Mode
   - Biologic effect

5. **Fundamental Principles of Radiobiology:**
   - From Molecules of Humans
   - Human Biology
   - Physical Factors effecting Radio Sensitivity
   - Biologic factors affecting radiosensitivity
   - Radiation Dose/Response Relationships

6. **Molecular & Cellular Radio Biology:**
   - Irradiation of Macromolecules
   - Radiolysis of Water
   - Cell Survival Kinetics
   - Target Theory
7. **Early Effects of Radiation:**
   - Acute Radiation Lethality
   - Local Tissue Damage
   - Haemolog effects
   - Cytogenetic effect.

8. **Late Effects of Radiation:**
   - Local Tissue Effects
   - Life Spane Shortening
   - Risk estimation
   - Radiation Induced Malignancy
   - Total Risk of Malignancy
   - Radiation in Pregnancy

9. **Health Physics:**
   - Cardinal Principles of Radiation, Projection
   - Maximum permissible Dose
   - X-Ray in Pregnancy

10. **Design Radiologic Imaging Facilities:**
    - Designing Team
    - Departmental Activity
    - Location of X-Ray Deptt
    - Place Layout
11. **Design for Radiation Protection:**
   - Design of X-Ray Apparatus
   - Design of Protective Bassins
   - Radiation detection & measurement

12. **Radiation Protection Procedure.**
   - Occupational Exposure
   - Patent dose
   - Reduction of Occupational Exposure
   - Reduction of Un-necessary Patent Dose
RADIOLOGICAL PROCEDURES

1. **Lymph Glands & Lymphatic:**
   - Lymphography

2. **Arthrography:**
   - General Points
   - Double Contrast Knee Arthrography
   - Hip Arthrography
   - Double Contrast Shoulder Arthrography
   - Elbow Arthrography
   - Wrist Arthrography
   - Ankle Arthrography

3. **Central Nervous System:**
   - Contrast Media for Myelography
   - Lateral Cervical Puncture
   - Cisternal Puncture
   - Myelography with Water
   - Soluble, Contrast Media
   - Air Encephlography
   - Ventriculography
   - Special Techniques for demonstration of the internal auditory meatus
   - Air Meatography
   - Myodil Cistemoigraphy
4. Dacryocystography
5. Sialography

**Method of Teaching:**

- Lectures
- Demonstrations
- Practical Work

**Attendance:**

- Every student has to attend 90% of the classes

**Grading & Evaluation:**

- There shall be 3 monthly tests of 20 marks each; which shall be held in the comprehensive exam in the end of semester. Passing marks will be 60%

**Recommended Books:**

- Radiological Science for Technologists (Stewart C Bushong)
- Techniques in diagnostic radiology (G. II White House, BS Worthington)
- A guide to radiological procedures (Stephen Chapman and)
- Radiological Positioning (Kitty Clark)
- Atlas of radiological anatomy
- Atlas of CT/M.R Cross-sectional anatomy