

COURSE TITLE: RADIOTHERAPY TECHNIQUES-I & CLINICAL PRACTICE

STUDY HOURS: 60+160
PAPER : 01
Term : 3rd

MARKS
THEORY 120
PRACTICAL: 30
TIME: 03HRS

COURSE CONTENTS STUDY HOURS
(Theory +Practical)
20

- A. Anatomy & Physiology Related to Radiotherapy**
 - A1. General features of bones.
 - A2. Bones of upper limb
 - A3. Bones of lower limb
 - A4. Bones of Thoracic
 - A5. Bones of Skull
 - A6. Bones of Pelvic
 - A7. Soft tissue
 - A8. Special Sensory
 - A8.1. Skin
 - A8.2. Ear
 - A8.3. Nose
 - A8.4. Eye

- B. Digestive System**
 - B1. Mouth
 - B2. Pharynx & Esophagus
 - B3. Gastrointestinal tract
 - B4. Associated glands, salivary glands, liver, pancreas

- C. Nervous System**
 - C1. Brain & there parts
 - C2. Spinal Cord

D. Female Genital Organ

D1. Uterus

D2. Fallopian Tube

D3. Memory Gland

E. Radiotherapy PHYSICS

4+10

E1. Atomic Structure

E1.1 Electrons

E1.2 Neutrons

E1.3 Protons

E2. Radioactivity

6+10

E2.1 Radioactivity

E2.2 Decay Constant

E2.3 Activity

E2.4 The half life and the Mean life

E2.5 Modes of Radioactive Decay

E2.6 Alpha particle Decay

E2.7 Beta particle Decay

E2.8 Gamma Decay

E3. Production of X-rays

10+20

E3.1 The X-Ray Tube

E3.2 The Anode

E3.3 The Cathode

E3.4 Basic X-Ray Circuit

E3.5 Voltage Rectification

E3.6 Physics of X-Ray Production

E3.7 Bremsstrahlung

E3.8 Characteristic X-Rays

E3.9 X-Ray Energy Spectra

E3.10 X-Ray Characteristics

E3.11 Filters

E3.12 Half Value Layer

E4. Interaction of Ionizing Radiation

4+20

E4.1 Ionization

E4.2 Photon Beam Attenuation	
E4.3 Photoelectric Effect	
E4.4 Compton effect	
E4.5 Pair Production	
E4.6 Importance in Radiotherapy	
E5. Measurement of Ionizing radiation and Units	6+20
E5.1 The Roentgen, Kerma, Radiation absorbed dose	
E5.2 Free Air Ionization Chamber	
E5.3 Thimble Chamber	
E5.4 Farmer Chamber	
E5.5 Electrometer	
E5.6 Radiation Absorbed Dose	
E5.7 SI Units	
E6. Beam Characteristics	10+20
E6.1 Photon	
E6.2 Electron	
E6.3 Heavy Particle	

PRACTICAL TECHNIQUE I

1. CLINICAL EXPERIENCE 20

This session is designed to provide the aspiring radiation therapy technologist with a general overview of the activities in a modern radiation therapy department

2. TREATMENT PLANNING PROCESS

Radiation therapy preparatory phase 20

- a. Patient file
- b. Anamnesis (taking information directly from the clinicians medical history notes)
- c. Medical aspects
- d. Information
- e. Treatment proposal

Localization 20

- a. Information and communication
- b. Dimensions
- c. Patient positioning, immobilization and reproduction
- d. Localization data
- e. Contours
- f. Documentation

g. Lasers/Markings

RECOMMENDED BOOKS

1. Radiological sciences for technologist (Stewart C. Bushong)
2. Techniques in diagnostic radiology (G.II White House B.S. Worthington)
3. A guide to radiological procedures (Stephenchampanand)
4. Radiological positioning (Kitty Clark)
5. Atlas of radiological anatomy
6. Atlas of AC.T/M.R Crossectional anatomy
7. The physics of Radiation therapy ,Faiz M.Khan, Williams and Willkins 3rd Edition
8. Radiologic Sciences for technologists ,Stewery C Bbushong, Mosby Publisher.2nd
9. Radiation Therapy Planning Gunilla C. Bentel Megraw-Hill 2nd Edition
10. Radiotherapy Principal to practice, Sue.E.griffiths, Chris A, Churchil Livingstone
11. Manual of Clinical Oncology, Dennis A. Casciato Barry B.I. owitz, little, Brown & Company. 3rd Edition
12. Practical Radiotherapy Planning, Dobbs J & Barrate, Arnold
13. Radiation Therapy Simulation Work Book, Sue Mizc, Rhonda, Pergamon Press
14. Oxford Textbook of Oncology-Souhami, Tannock, Hohenberger & Horiot
15. Clinical Epidemiology; A Basic science for clinical Medical-Sackett
16. The Basic science of oncology-Tannock, Hill, Bristow & Harrington

C6 Simulator

- D. **Physical characteristics**
- E. **Optical systems**
- F. **Couches**
- G. **Laser systems**

H. **SIMULATION & X-RAY ROOM PROCEDURE** **6+20**

H1 Students will be given exposure of x-ray techniques & simulation procedures
H2 Dark room procedure film handling
H3 Principal of simulation

I. **RADIOTHERAPY** **10+20**

- I1 Oncology and Epidemiology
For each identified site the etiology and epidemiology, signs and symptoms, diagnosis and general management must be covered
- I2 Breast
- I3 Gynecological
- I4 Gastro-intestinal tract
- I4 Skin
- I5 Eye tumours
- I6 For the above mentioned system the following aspects have to be needed
 - I6.1 Cancer prevention and public education
 - I6.2 Promoting a healthy lifestyle
 - I6.3 Early detection
 - I6.4 Screening
 - I6.5 Benign and malignant disease
 - I6.6 Methods of spread of malignant disease
 - I6.7 Staging and grading systems
 - I6.8 Introduction to genetics, genetic predisposition and high risk groups

PRACTICAL II

J. **TREATMENT DELIVERY TECHNIQUES**

- J1 Common treatment delivery techniques**
- J1.1 Single field

4+30

- J1.2 Parallel opposed
- J1.3 Multiple fields
- J1.4 Tangential and oblique
- J1.5 Box technique
- J1.6 Wedge fields

- J2. Treatment** **4+10**
- J2.1 Information
- J2.2 Set-up
- J2.3 Manual
- J2.4 Computer assisted
- J2.5 Data verification, registration or imaging
- J2.6 Verification
 - J2.6.1. Epid and portal imaging
 - J2.6.2. Epid portal and decision.

- K. Patient positioning, immobilization and reproducibility** **4+10**
- k.1 Set-up procedures
- k.2 Manual
- k.3 Computer assisted
- k.4 Data verification, registration or recording
- k.5 Verification (portal imaging)
- k.6 Documentation

- K. Treatment techniques** **4+10**
- k1 Treatment techniques of the following sites on simulation & treatment machines
- k2 Breast
- k3 Gynecological
- k4 Gastro-intestinal tract
- k5 Skin
- k6 Eye tumours

- L. Patient management on treatment** **4+10**
- L1 Side effect related to radiation and dose
- L2 Acute
- L3 Late
- L4 Monitoring of side effects
- L5 Management of side effects
- L6 Information and communication
- L7 Documentation of side effects

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