

**KHYBER PAKHTUNKHWA MEDICAL FACULTY PESHAWAR**

**CURRICULUM**

**2<sup>nd</sup>, 3<sup>rd</sup>, & 4<sup>th</sup> Semester**

**DIPLOMA COURSE**

**PSYCHIATRY TECHNOLOGY**



Bungalow No.86/D-5 Abdara Road University Town,  
Peshawar.

Phone No.091-9216008 Fax No 091-9218630

Website: [www.kpmf.edu.pk](http://www.kpmf.edu.pk) Email: [info@kpmf.edu.pk](mailto:info@kpmf.edu.pk)

# 2<sup>nd</sup> Semester

## Paper "A"

### COURSE CONTENTS

#### SPECIAL ANATOMY

- Neuron
- Surface
- Meninges
- Surface anatomy of brain especially motor & sensory cortex as well as brain stem.
- Gross anatomy of Cerebrum, Cerebellum, Midbrain, Pons  
Medulaoblangata
- Blood supply of the brain
- Enumerate different cranial nerves
- Basal Gangila & Cerebral cortex
- Synapse & Neuro trasmittter
- Lumbic system
- Imported Enzyme

#### SPECIAL PHYSIOLOGY

- function of Cerebrum, Cerebellum, Midbrain, Pons & Medul oblongata
- what is synapse
- enzyme and its function
- important neurotransmitter's
- Functions of basal ganglia & cerebral cortex
- Dominant & Non-dominant hemisphere & their function

# 2<sup>nd</sup> Semester

## Paper “B”

### PHARMACOLOGY & ITS APPLICATION

- Anti epileptic
- Anti depressant
- Anti psychotics
- Anxiolytics
- Analgesics
- Sedative
- Mood stabilizers
- Anti cholinergic

### ETHICS

- Philosophical Ethics and clinical psychology
  - Ethics
  - Ethical theories
  - Ethical principles
- Applied ethics in clinical psychology
  - Ethics in psychotherapy
  - Methods and techniques of psychotherapy
  - Ethics in psychological assessment

### PRACTICAL

- Patients receiving
- Patients evaluation
  - Neuro psychiatric examination
  - Behavioral Neurologic examination
- Investigation
  - Rutine investigations
  - Special investigations
- Patient management
- Patient counseling
- Patient preparation for procedure

### Recommended Books

- ✓ Foundation of Anatomy & Physiology by Kathleen J.W,Wilson
- ✓ Anatomy & Physiology for Nurses
- ✓ Ethics in clinical Psychology by Jane Steere by Oxford University
- ✓ General Hospital psychiatry by Micheal Alan Taylor and others

# **3<sup>rd</sup> Semester**

## **Paper "A"**

### **COURSE CONTENTS**

#### Common Psychiatry Disorder

##### **1. Introduction to**

- Mental Health
- Course of Mental Health Problems
- Common Psychiatric symptoms
- Mental state examination
- Classification system in psychiatry

##### **2. Introduction to**

- Depression
- Conversion Disorder
- Psychosis
- Anxiety Disorder
- Epilepsy
- Durg dependence
- Nero Phychiatry
- Senile dementia
- Schizophrenia

## **Paper “B”**

### **1. Electroconvulsive Therapy**

- Procedure
- ECT machine
- Mechanism of ECT
- Indication of ECT
- Contra Indication of ECT
- Relevant investigation
- Preparation of patient for ECT

### **2. Non Pharmacological Treatment in Psychiatry**

- Counseling
- Crises invention
- Cognitive therapy
- Cognitive behavior therapy
- Psychodynamic psychotherapy
- Group therapy

### **3. Practical**

- Receiving of psychiatric patient
- Investigation in psychiatry
- Lab investigation
- Psychological investigation
- Social investigation
- Observation of abnormal psychological behavior in indoor and outdoor patients
- Care of mentally ill patient with associated physical illness
- Management of risk in indoor patients

### **Recommended Books**

- ✓ Group psychotherapy theory and practice by Hogh Mullan
- ✓ General Hospital Psychiatry by Micheal Aan Taylor and others

**Curriculum for radiotherapy Technology Diploma Course Adapted  
from International Atomic Energy Agency (IAEA)/ AFRA-RCA  
Curriculum**

(3<sup>rd</sup> semester)

**TECHNIQUE-I**

**A. RADIOTHERAPY PHYSICS**

**1. Atomic Structure**

a. Electrons	1
b. Neutrons	1
c. Protons	1

**2. Radioactivity**

a. Radioactivity	1
b. Decay Constant	1
c. Activity	1
d. The half life and the Mean life	1
e. Modes of Radioactive Decay	
f. Alpha particle Decay	
g. Beta particle Decay	
h. Gamma Decay	

**3. Production of X-rays**

a. The X-Ray Tube	2
b. The Anode	
c. The Cathode	1
d. Basic X-Ray Circuit	
e. Voltage Rectification	1
f. Physics of X-Ray Production	1
g. Bremsstrahlung	1
h. Characteristic X-Rays	1
i. X-Ray Energy Spectra	1
j. X-Ray Characteristics	1
k. Filters	1
l. Half Value Layer	1

**4. Interaction of Ionizing Radiation**

a. Ionization	1
b. Photon Beam Attenuation	1
c. Photoelectric Effect	1
d. Compton effect	1
e. Pair Production	1
f. Importance in Radiotherapy	1

<b>5.</b>	<b>Measurement of Ionizing radiation and Units</b>	<b>2</b>
a.	The Roentgen, Kerma, Radiation absorbed dose	1
b.	Free Air Ionization Chamber	1
c.	Thimble Chamber	1
d.	Farmer Chamber	1
e.	Electrometer	1
f.	Radiation Absorbed Dose	1
g.	SI Units	1

**6. Beam Characteristics**

a.	Photon	1
b.	Electron	1
c.	Heavy Particle	1

**B. MATHMTICS 12**

Review of real Applied Mathematics, Statistics, numbers and properties, exponential factors, algebraic expressions, variables, sequence and series, algorithm, basic probability, limits and derivations equation, graphs, functions concepts of geometry, trigonometry

**C. MEDICAL IMAGING**

a.	Intensifying Screens	1
b.	Beam restriction devices	1
c.	The grid	1
d.	Radiographic quality	1
e.	Radiographic exposure	1
f.	Select plain film procedure	1
g.	Mammography	1
h.	Fluoroscopy	1
i.	Introduction to computer science	1
j.	Digital X-ray imaging	2
k.	Computed tomography	8
l.	Quality control	1

**D. RADIOTHERAPY EQUIPMENTS 8**

**Treatment & Simulation Units**

- a. Superficial
- b. Orthovoltage
- c. Cobalt
- d. Linear Accelerator (Photons and electrons)

- e. Brachytherapy
- f. Simulator
- **Physical characteristics** 2
- **Optical systems** 2
- **Couches** 2
- **Laser systems** 2

## **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

### **3. SIMULATION & X-RAY ROOM PROCEDURE 20**

- a. Students will be given exposure of x-ray techniques & simulation procedures
- b. Dark room procedure film handling
- c. Principal of simulation

## **TECHNIQUE-II**

### **1. RADIOTHERAPY 40**

Oncology and Epidemiology

For each identified site the etiology and epidemiology, signs and symptoms, diagnosis and general management must be covered

Breast 2

Gynecological 2



Gastro-intestinal tract	2
Skin	2
Eye tumours	2
For the above mentioned system the following aspects have to be needed	
• Cancer prevention and public education	4
• Promoting a healthy lifestyle	2
• Early detection	2
• Screening	2
• Benign and malignant disease	6
• Methods of spread of malignant disease	6
• Staging and grading systems	4
• Introduction to genetics, genetic predisposition and high risk groups	4

## **PRACTICAL TECHNIQUE II**

<b>1. TREATMENT DELIVERY TECHNIQUES</b>	<b>20</b>
<b>Common treatment delivery techniques</b>	
a. Single field	
b. Parallel opposed	
c. Multiple fields	
d. Tangential and oblique	
e. Box technique	
f. Wedge fields	
<b>Treatment</b>	<b>10</b>
a. Information	
b. Set-up	
Manual	
Computer assisted	
Data verification, registration or imaging	
Verification	
Epid and portal imaging	
Epid portal and decision.	
<b>Patient positioning, immobilization and reproducibility</b>	<b>20</b>
a. Set-up procedures	
b. Manual	
c. Computer assisted	
d. Data verification, registration or recording	
e. Verification (portal imaging)	
f. Documentation	
<b>Treatment techniques</b>	<b>20</b>
Treatment techniques of the following sites on simulation & treatment machines	
Breast	
Gynecological	

Gastro-intestinal tract

Skin

Eye tumours

**Patient management on treatment**

**10**

- a. Side effect related to radiation and dose
- b. Acute
- c. Late
- d. Monitoring of side effects
- e. Management of side effects
- f. Information and communication
- g. Documentation of side effects

## **METHOD OF TEACHING**

1. Lectures
2. Demonstrations
3. Practical work

## **ATTENDANCE**

Every student has to attend 90% of the classes

## **GRADING & EVALUATION**

There shall be 3-monthly tests of 20 marks each; passing marks shall be 50%

## **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 3<sup>rd</sup> Edition
8. Radiologic Sciences for technologists ,Stewery C Bbushong, Mosby Publisher.2<sup>nd</sup>
9. Radiation Therapy Planning Gunilla C. Bentel Megraw-Hill 2<sup>nd</sup> Edition
10. Radiotherapy Principal to practice, Sue.E.grifiths, Chris A, Churchil Livingstone
11. Manual of Clinical Oncology, Dennis A. Casciato Barry B.I. owitz, little, Brown & Company. 3<sup>rd</sup> 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

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Curriculum**

**(4<sup>th</sup> Semester)**

**TECHNIQUE-I**

**A. Radiotherapy Physics**

**1. Radiation Detectors**

a.	Ionization Chamber	1
b.	Geiger Muller Counter	1
c.	Scintillation Counter	1
d.	Solid State Detector	1

**2. Nuclear Radiation Exposure**

a.	Natural sources of Radiation	1
b.	Man made Radiation Sources	1
c.	Biological Effect of Radiation	1
d.	Use of Nuclear Radiation	1
e.	Tracer Techniques	1
f.	Medical uses of Radioisotopes	2
g.	Biological uses	2
h.	Agricultural uses	1
i.	Industrial uses	2

**3. Dose Distribution and Scatter Analysis**

a.	Phantoms	1
b.	Depth Dose Distribution	2
c.	Percentage Depth Dose	1
d.	Tissue Air Ratio	1
e.	Tissue Phantom Ratio	1
f.	Tissue Maximum Ratio	1
g.	Wedge Filter	1
h.	Wedge Angle	1
i.	Wedge Transmission Factor	2
j.	Isodose Chart	1
k.	Effect of Source Size	2
l.	SSD	1
m.	SDD	1

- n. Field Size Collimation 1
- o. Penumbra 1

## **B. MEDICAL IMAGING**

- a. Physical principles of MRI 1
- b. Equipment with images 1
- c. Physical principles of ultrasounds 1
- d. Diagnostic ultrasounds 2
- e. Principles of radiobiology 1
- f. Molecular & cellular radiobiology 2
- g. Early & late effects of radiation 2
- h. Health physics 1
- i. Design for radiological image facilities 1
- j. Design for radiological protection 1
- k. Radiation protection procedures 1

## **C. RADIATION PROTECTION**

- a. Basic concepts of radiation protection 1
- b. Sources of radiation 1
- c. Radiation dose limits 1
- d. Risk estimation 1
- e. Personal and area monitoring survey 2
- f. Basic concepts of shielding 1
- g. Administration of regulation protection according to relevant regulatory body 1
- h. Radiation detector and equipments 1
- i. Personal monitor (film badge, pocket alarm dosimeters, TLD) 2
- j. Area monitoring (survey meters) 1

## **D. RADIOTHERAPY EQUIPMENTS**

### **Brachytherapy**

- a. Principle of brachytherapy 2
- b. Radioactive source 2
- c. HDR 2
- d. LDR 1

### **CT Simulator**

- a. Principle 2
- b. Application 2

### **Treatment Planning Computer**

- a. Principle 2
- b. Application 2

# PRACTICAL TECHNIQUE I

## 1. PLANNING AND DOSE CALCULATION PROCESS

<b>Planning &amp; dose calculation</b>	<b>40</b>
Dimensions – 1D (one dimension)	
PDD ( Percentage depth dose), TAR ( Tissue air ratio),	
OAR (Organs at risk), TMR (Tissue maximum ratio), TPR (Tissue phantom ratio)	
Influence of shielding and FSD on the dose distribution	
2D (two dimension)	
3D (three dimension)	
Beam shaping and modification	

<b>Calculations</b>	<b>40</b>
ICRU recommendation (International commission for radiological units)	
Dose limits	
Target volume and critical organ delineation	
Treatment plan analysis and evaluation	
Documentation	

<b>Simulation</b>	<b>30</b>
Isocenter	
Planning data	
Documentation	
Generation of DRRs (Digitally reconstructed radiograph)	

<b>Verification</b>	<b>10</b>
Portal Film	

## 2. MOULD ROOM

Information and communication	
Materials in Radiotherapy used for Shielding	
Moulds	
Customized Shielding	
Management of pollution and hazards	<b>10</b>

## TECHNIQUE-II

### 1. RADIOTHERAPY

Oncology and Epidemiology  
For each identified site the etiology and epidemiology, signs and symptoms, diagnosis and general management must be covered

Head and neck	3
Prostate	3
Lung	3
Lymphomas	3

Bladders	3
CNS	3
Sarcomas	3
For the above mentioned system the following aspects have to be needed	
• <b>Cancer prevention and public education</b>	<b>3</b>
• <b>Promoting a healthy lifestyle</b>	<b>3</b>
• <b>Early detection</b>	<b>3</b>
• <b>Screening</b>	<b>3</b>
• <b>Benign and malignant diseases</b>	<b>3</b>
• <b>Methods of spread of malignant disease</b>	<b>3</b>
• <b>Staging and grading systems</b>	<b>3</b>
• <b>Introduction to genetics, genetic predisposition and high risk groups</b>	<b>3</b>

## **PRACTICAL TECHNIQUE II**

### **1. TREATMENT DELIVERY TECHNIQUES 40**

Treatment techniques of the following sites on simulation & treatment machines

Head and neck

Prostate

Lung

Lymphomas

Bladders

CNS

Sarcomas

**Others as considered appropriate**

#### **Treatment 40**

Information

Set-up

    Manual

    Computer assisted

Data verification, registration or recoding

Verification

    EPID Electronic Portal imaging device

    EPID Protocol and decision.

#### **Patient positioning, immobilization and reproducibility 40**

Set-up procedures

    Manual

    Computer assisted

Data verification, registration or recording

Verification (portal imaging)

Documentation

#### **Patient management on treatment 40**

Side effect related to radiation and dose

    Acute

    Late

Monitoring of side effects

Information and communication  
Documentation of side effects  
**METHOD OF TEACHING**

1. Lectures
2. Demonstrations
3. Practical Work

### **ATTENDANCE**

Every students has to attend 90% 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**

1. Radiological science for technologist (Stewart C.Bushong)
2. Techniques in diagnostic radiology (G.II white House B.S Worthington )
3. Atlas of AC.T /M.R Crossectional anatomy
4. The Physics of radiation therapy, Faiz M. Khan, Williams and Willkins 3<sup>rd</sup> Edition
5. Radiation Therapy Planning Gunilla C. Bental Megraw-Hill 2<sup>nd</sup> Edition
6. Manual of Clinical Oncology, Dennis A. Casciato Barry B.I.owitz, Little, Brown & Company. 3<sup>rd</sup> Edition
7. Practical Radiotherapy Planning, Dobbs J & Barrate, Arnold
8. Radiation Therapy Simulation Work Book, Sue Mizc, Rhonda, Pergamon Press
9. Oxford Tectbook of Oncology – Souhami, Tannock, Hohenberger & Horiot
10. Clinical Epidemiology: A Basic science for clinical Medical – Sackett
11. The Basic science of oncology – Tannock, Hill Bristow & Harrington

### **EXTERNAL EXAMINATION FOR DIPLOMA COURSE OF RADIOTHERAPY TECHNOLOGIST.**

#### **Medical Physicists**

- Mr. Akbar Ali (Sr. Scientist), INOR Abbottabad)
- Mr. Karim Khan (Sr. Scientist, SINOR, Swat)
- Mr. Misbah ul Haq ( Sr. Scientist, SINOR, Swat)

#### **Radiation Oncologists**

- Dr. Rubina Ali ( Pr. Medical Officer, NORI, Islamabad)
- Dr. Kokab (Pr. Medical Officer, BINO, Bhawalpur)
- Dr. Naeem Leghari ( Deputy Chief Medical Officer, NIMRA, Jamshoro)