

Mymensingh Polytechnic
Institute, Mymensingh.
Institute Code : 57067

Electro-Medical Department

CODE : 686

Medical Physics and Nuclear Instruments

Subject code: 68672

Semester: 7th

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Department, Electro-medical.**

CHAPTER ONE

Understand the concept of medical physics

Learning Outcomes...

To provide the students with an opportunity to develop knowledge, skill and attitude in the area of medical physics and nuclear instruments with emphasis on:

- Health physics
- The major role of health physics
- The structure of macromolecules
- Behavior of macromolecules
- Macromolecular properties using thermodynamics.

QUESTIONS...?

Chapter Two

Understand the radioactivity

Learning Outcomes...

To provide the students with an opportunity to develop knowledge, skill and attitude in the area of medical physics and nuclear instruments with emphasis on:

- Half life and mean life
- Artificial radioactivity
- Units of radioactivity
- The relationship between the decay constant and half life
- The nature of alpha, beta and gamma radiation
- Uses of radioactive isotope
- Nuclear fission and fusion.

QUESTIONS...?

Chapter Three

Understand the nuclear particle
detectors

Learning Outcomes...

To provide the students with an opportunity to develop knowledge, skill and attitude in the area of medical physics and nuclear instruments with emphasis on:

- Nuclear radiation detectors
- The construction and operation of Geiger Muller tube
- The construction and operation of ionization chamber
- The cloud chamber
- The bubble chamber
- The construction and operation of scintillation counter
- The construction and operation of proportional counter
- The detection mechanism of semiconductor detector.

QUESTIONS...?

Chapter Four

Understand the radiation dosimetry

Learning Outcomes...

To provide the students with an opportunity to develop knowledge, skill and attitude in the area of medical physics and nuclear instruments with emphasis on:

- Radiation dosimetry
- The construction and operation of Geiger Muller tube
- The construction and operation of ionization chamber
- The cloud chamber
- The bubble chamber
- The construction and operation of scintillation counter
- The construction and operation of proportional counter
- The detection mechanism of semiconductor detector.

QUESTIONS...?

Chapter Five

Understand the biological effect
of radiation

Learning Outcomes...

To provide the students with an opportunity to develop knowledge, skill and attitude in the area of medical physics and nuclear instruments with emphasis on:

- Normal standard dose(NSD)
- Description of normal standard dose(NSD)
- Dose response characteristics
- The radiation effect
- The mechanism of radiogenic effect
- The acute effects of radiation on human body
- The long term effects of radiation on human body.

QUESTIONS...?

Chapter Six

Understand the radiation
protection

Learning Outcomes...

To provide the students with an opportunity to develop knowledge, skill and attitude in the area of medical physics and nuclear instruments with emphasis on:

- Environment radiation
- The principles of radiation protection
- The radiation protection against small sources
- External radiation protection
- Internal radiation protection
- The recommendation of international commission on radiological protection
- The national radiation protection rules of Bangladesh.

QUESTIONS...?

Chapter Seven

Understand the electron therapy

Learning Outcomes...

To provide the students with an opportunity to develop knowledge, skill and attitude in the area of medical physics and nuclear instruments with emphasis on:

- Electron interaction and electron scattering
- The depth dose distribution
- Electron therapy treatment planning
- The process of electron beam therapy
- Uses and side-effects electron therapy.

QUESTIONS...?

Chapter Eight

Understand the nuclear medicine
imaging system

Learning Outcomes...

To provide the students with an opportunity to develop knowledge, skill and attitude in the area of medical physics and nuclear instruments with emphasis on:

- Radio isotopes and labeled compounds
- Basic concepts of nuclear biomedical instrument
- The construction and working principle of rectilinear scanner
- The construction and working principle of gamma camera
- The basics theory of positron emission tomography(PET)
- The data acquisition system of a PET scanner
- The basics theory of SPECT
- The applications of SPECT and PET scanner.

Question ?

Chapter Nine

Understand the thyroid
radioiodine uptake measurement

Learning Outcomes...

To provide the students with an opportunity to develop knowledge, skill and attitude in the area of medical physics and nuclear instruments with emphasis on:

- Reno graphy
- The operation of renogram
- The explanation of thyroid radioiodine uptake system
- Uptake monitoring equipment with block diagram.

QUESTIONS...?

CHAPTER TEN

Understand medical thermograph

Learning Outcomes...

To provide the students with an opportunity to develop knowledge, skill and attitude in the area of medical physics and nuclear instruments with emphasis on:

- Infrared radiation
- Infrared detector
- Thermo graphic equipment
- The block diagram of an infrared scanner
- The schematic diagram for digitization of a thermo gram.

QUESTIONS...?

CHAPTER ELEVEN

Understand external beam Radio
therapy

Learning Outcomes...

To provide the students with an opportunity to develop knowledge, skill and attitude in the area of medical physics and nuclear instruments with emphasis on:

- Define characteristics x-rays and continuous x-rays
- Explain x-ray targets
- The production of clinical x-ray beams
- The working process of x-ray machines for radiotherapy.

QUESTIONS...?

CHAPTER TWELVE

Understand production of gamma
ray beams

Learning Outcomes...

To provide the students with an opportunity to develop knowledge, skill and attitude in the area of medical physics and nuclear instruments with emphasis on:

- Basic properties of gamma rays
- Tele therapy sources
- Tele therapy housing
- Dose delivery with tele therapy machine
- Collimators and penumbra
- Working principle of tele therapy machine.

QUESTIONS...?

CHAPTER THIRTEEN

Understand particle accelerator

Learning Outcomes...

To provide the students with an opportunity to develop knowledge, skill and attitude in the area of medical physics and nuclear instruments with emphasis on:

- Beta-tron, cyclotron, micro-tron
- The types of particle accelerator
- Electro-dynamic particle accelerator
- Linear accelerator generation
- The component of modern linear accelerator
- The radio frequency power generation system of linear accelerator
- The safety rules of linear accelerator installation.

QUESTIONS...?

CHAPTER FORTEEN

Understand brachytherapy

Learning Outcomes...

To provide the students with an opportunity to develop knowledge, skill and attitude in the area of medical physics and nuclear instruments with emphasis on:

- Brachytherapy
- The types of radiotherapy
- The working principle of brachytherapy
- The advantages and disadvantages of EBRT and IBRT.

QUESTIONS...?

Thank You!