

MMRIT 4th Semester

Course Title: Nuclear Medicine Imaging Techniques			
Semester: IV	Course code: MRT -401	Credits:08	Core
No of sessions Lectures / Tutorial:60		No of practical hours:60	
Course Pre-requisites:		Number of sessions: 90	

Objectives:

1. To know basic principle and physics of nuclear medicine.
2. Preparation of patient for nuclear medicine examination.
3. Preparation and precautions while handling radiopharmaceuticals.
4. Recognizing the artefacts associated with nuclear medicine.
5. To learn the measures for improving image quality in nuclear medicine.

Course Outcomes

CLO-1. Students will be able to prepare and position the patients for nuclear medicine examination.

CLO-2 Knowledge of improving image quality in nuclear medicine.

CLO-3 Scanning of patient with various nuclear medicine protocols for better representation of images.

CLO-4 Post processing for nuclear medicine data

CLO-5 Management of patient for any late reactions associated with radiotracers in nuclear medicine.

MODULE-1

Basic atomic and nuclear physics Quantities activity Atomic composition and structure Nucleus composition Radioactivity Exponential decay Specific activity Parent/Daughter decay

Modes of Radioactive decay

MODULE-2

Radiation detectors Gas filled detectors-Basic principles Ionization chambers Proportional counters Geiger Muller counters Semiconductor detectors Scintillation detectors-basic principles

MODULE-3

Production of radio nuclides Reactor produced radio nuclide Reactor principles Accelerator produced radionuclide Radionuclide generators Instrumentation Basic principles System components Detector systems and electronics Collimators Image display an recording systems

Scanning cameras Radio pharmacy Radio pharmaceuticals General principles of tracer technique

Preparation of different labeled compounds with technetium-99m isotope Cold kits

MODULE-4

In vivo technique Static and dynamic studies Thyroid imaging Imaging of bone Respiratory system Urinary system G.I system Cardiovascular system Iodine 131 uptake studies Iodine 131 therapy of thyrotoxicosis and thyroid ablation

MODULE-5

SPECT imaging PET imaging Radiation safety in nuclear medicine Radiation units quantities MPD Safe handling of radioactive materials Storage of radioactive materials Procedures for handling spills Disposal of radioactive waste Radiation monitoring Survey meters Personnel dosimeters Wipe testing Contamination monitor Isotope calibrator Area monitor Inventory of isotopes

Course Assessment:

Students would be assessed continuously throughout the semester in the form of continuous evaluation. Periodic tests and surprise tests will be conducted. Students will have to submit written assignments, make charts and posters, make models, and conduct quiz for the topics. Practical will be conducted with viva. Midterm and end term evaluation will be done theoretically and practically. Students will also be assessed on the basis of presentations of various topics.

References :

1. Physics in Nuclear Medicine-**Sorenson**
2. Physics in Nuclear Medicine-**Powsner**

Course Title: Seminars, Journal Clubs and Group Discussions			
Semester: IV	Course code: MRT -40	Credits:2	Core
No of sessions Lectures / Tutorial:--		No of practical hours:--	
Course Pre-requisites:		Number of sessions: 60	

Course Introduction

To demonstrate the students of bachelor level and patient handling method of various aspects the importance of sterilization and proper disposals is only way to prevent it. Well known sayings, prevention is better than cure, the main objective of this course is to focus mainly on the preventive measures and quality assurance to the patients. This course emphasizes more on risk management principles and safe handling of disposals, basic emergency care and basic life support skills which can prove remedy in emergency cases.

2. Course Objectives: The main objective of this course is to teach students quality measures to provide patients with effective methods of treatment with more focus on proper handling of infected specimens and proper treatment with best sterilized and disinfected means to reduce the cross-infection scenario and nosocomial infections, which occurs due to poor handling of infected specimens and improper disposal means polluting environment too. Students are made to learn basic concepts of quality in health care and develop skills to implement sustainable quality assurance program. Introducing students to basic emergency care, infection prevention & control with knowledge of biomedical waste management and antibiotic resistance.

3. Course Learning Outcomes

Upon successful completion of the course, the students should be able to:

CL01: Understood quality improvement approaches, NABH, NABL, guidelines which purely focuses on the quality measures and proper handling of disposals providing quality facility to patients. (Understanding Based)

CL02: Understood basic life support skills which can save many lives in urgent cases. (Applying Based)

CL03: Understood proper disposals of biomedical waste, reducing risk of infection to waste handling personnel and cross infection which can occur due to improper handling of infected waste polluting surroundings too. (Applying Based)

CL04: Understood effective hand hygiene, prevention and control of common health care associated infections. (Remembering Based)

CL05: Understood fundamentals of emergency management, disaster preparedness. (Remembering Based)

Course Contents

Each student will be assigned topics for presentations as seminars, will explore recent innovations in MRIT for presenting topics during journal clubs and shall be holding group discussions along with other students in the presence of MRIT faculty. This will also include visits to other Institutions, Factories or Industries in the field of MRIT.

Course Assessment:

Continuous evaluation by faculty in-charge of the department

Course Title: Residency – II			
Semester: III	Course code: MRT - 305	Credits:01	Core
No of sessions Lectures / Tutorial: --		No of practical hours: 120	
Course Pre-requisites:		Number of sessions: 60	

1. Course Introduction

To demonstrate the students of bachelor level and patient handling method of various aspects the importance of sterilization and proper disposals is only way to prevent it. Well known sayings, prevention is better than cure, the main objective of this course is to focus mainly on the preventive measures and quality assurance to the patients. This course emphasizes more on risk management principles and safe handling of disposals, basic emergency care and basic life support skills which can prove remedy in emergency cases.

2. Course Objectives: The main objective of this course is to teach students quality measures to provide patients with effective methods of treatment with more focus on proper handling of infected specimens and proper treatment with best sterilized and disinfected means to reduce the cross-infection scenario and nosocomial infections, which occurs due to poor handling of infected specimens and improper disposal means polluting environment too. Students are made to learn basic concepts of quality in health care and develop skills to implement sustainable quality assurance program. Introducing students to basic emergency care, infection prevention & control with knowledge of biomedical waste management and antibiotic resistance.

3. Course Learning Outcomes

Upon successful completion of the course, the students should be able to:

CL01: Understood quality improvement approaches, NABH, NABL, guidelines which purely focuses on the quality measures and proper handling of disposals providing quality facility to patients. (Understanding Based)

CL02: Understood basic life support skills which can save many lives in urgent cases. (Applying Based)

CL03: Understood proper disposals of biomedical waste, reducing risk of infection to waste handling personnel and cross infection which can occur due to improper handling of infected waste polluting surroundings too. (Applying Based)

CL04: Understood effective hand hygiene, prevention and control of common health care associated infections. (Remembering Based)

CL05: Understood fundamentals of emergency management, disaster preparedness. (Remembering Based)

4. Course Pedagogy

This course will use mixed technique of interactive lectures, digital learning methodologies, regular assignments and power point presentations. Students will be made to prepare project reports by interacting directly with laboratory personnel and visits to hospital to engage the students in strengthening their conceptual foundation and applying the knowledge gained to different day to day real world applications. This course will focus mainly on applying based methodologies, students will not be made limited to theory only, but hands on practices and analyzing every aspect of the module by themselves.

Course Contents

In the residency the professional is expected to work and contribute in the medical imaging unit.

Course Assessment:

Continuous evaluation by faculty in-charge of the department.

Recommended book

Clark's Radiography- Clark
Radiographic positioning- Garkal
www.wikipedia.co.in
www.radiopedia.co.in