



Course Specification of Nuclear Medicine Equipment and Technique

Faculty: Faculty of Medicine and Health Sciences

Department: Health Sciences

Program: Bachelor of Radiologic Technology & Medical Imaging

I. General information about the course instructor :							
Name	Dr. Abdullah Taher	Office Hours (3 Hours Weekly)					
Location & phone number	UST- 715989708	Sat	Sun	Mon	Tue	Wed	Thu
E-mail	A.taher2@ust.edu					√	

II. General information about the course:						
1	Course Title :	Nuclear Medicine Equipment and Technique				
2	Course Code and Number :	BMI422				
3	Credit Hours :	Credit Hours				Total
		Theoretical	Seminar/Tutorial	Practical	Training	
		2	-	1	-	
4	Study Level and Semester:	4 th Year / 2 nd Semester				
5	Pre-requisites:	BMI321				
6	Co-requisites:	None				
7	Program in which the course is offered:	Bachelor of Radiologic Technology & Medical Imaging				
8	Teaching Language:	English				
9	Instruction location:	University of Science and Technology, Sana'a, Yemen				

III. Course Description	
<p>This course provides student with the principles of nuclear medicine equipment and nuclear imaging technique, as well as the relevant applications. The course topics will cover and focus on: nuclear medicine technology aspects, radioactivity, radiopharmaceuticals, radioisotope choice for nuclear imaging and nuclear therapy, nuclear medicine equipment including: Gamma camera, Single-Photon Emission Computed Tomography (SPECT), Positron Emission Tomography (PET), nuclear radiation dosimetry and calibration equipment, and some hybrid imaging including SPECT-CT, PET-CT, PET-MRI, in addition the quality control of nuclear medicine equipment. Also, this course covers most common nuclear medicine techniques and studies, principles of nuclear medicine therapy, moreover nuclear radiation dosimetry and safety aspects.</p>	

عميد الكلية:
د. عبدالله المخلافي

رئيس القسم:
د. عبد الحبيب القباطي

المراجع:
د. أمين الفلاحي
التاريخ: ١٤/٩

الموصف:
د. عبدالله طاهر

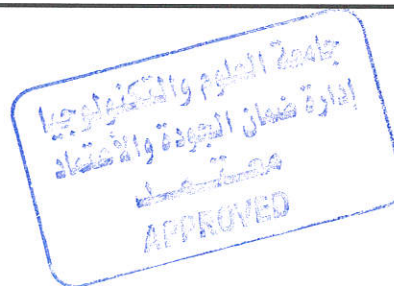
The course carried out using: lectures, self-learning, seminar, discussion, clinical practice, assignments and other activities to teach this course materials. The assessment strategies include presentation, assignment evaluation, practical exam and written exams.

IV. Course Aims:

1. Provide the students with basic knowledge about nuclear medicine technology, equipment, and techniques.
2. Learn the student to explain the role of nuclear medicine equipment and techniques within the diagnostic imaging.
3. Assist student to investigate imaging performance parameters, including uniformity of response, system sensitivity, spatial resolution, and image quality
4. Enable the student to use nuclear medicine technology skills in relevant nuclear imaging and radiotherapy applications.

V. Course Intended Learning Outcomes (CILOs) :

1. State the principles of nuclear medicine equipment techniques for most commonly used modalities.
2. Delineate safety aspects in nuclear medicine, including patient dosimetry, staff dosimetry, contamination, monitoring, and choice of equipment.
3. Interpret the role of technical factors and software components in the production of nuclear imaging.
4. Report common nuclear medicine studies under supervision.
5. Evaluate the effectiveness of exposure factors manipulation in nuclear image enhancement.
6. Apply optimal protocols including the QA procedures for nuclear medicine studies and examinations.
7. Manage with health team members to enhance the radiographic images.
8. Assess employed programs in performing and developing nuclear medicine systems.



VI. Course Contents

Theoretical Aspect:

No.	Course Units	Sub-topics	Week due	Contact Hours
1	Chapter 1: Nuclear Medicine Technology	<ul style="list-style-type: none"> - Introduction and concepts - Difference from Other Radiologic Techniques. - Advantages and Disadvantages of Nuclear medicine imaging - Nuclear Medicine Team <ul style="list-style-type: none"> - The Technologist's Role. - Clinical applications - Patient Preparation - Nuclear Medicine Procedures 	1 st -2 nd	4
2	Chapter 2: Radiopharmaceuticals	<ul style="list-style-type: none"> - Radioisotopes and Radioactivity - The Ideal Radionuclide for Imaging. - Targeting the Right Tissue or Organ. - Biodistribution and Radioisotope choice. 	3 rd	2
3	Chapter 3: Nuclear Medicine Equipment	<ul style="list-style-type: none"> - Gamma Scintillation Camera - Single-Photon Emission Computed Tomography (SPECT) - Positron Emission Tomography (PET) - PET/CT & SPECT/CT - PET/MRI - Nuclear radiation dosimetry and calibration equipment - Nuclear Medicine Equipment Quality Control 	4 th -7 th	8
4	Mid Term Exam	Mid Term Exam	8 th	2
5	Chapter 4: Nuclear Medicine Techniques and studies	<ul style="list-style-type: none"> - Bone Scan (techniques & Image Interpretation) - GI Bleeding scintigraphy (techniques & Findings and Interpretation) - Cardiac Imaging (techniques & Findings and Interpretation) - Lung Scan (techniques & Findings and Interpretation) - Renal Imaging (techniques & Findings and Interpretation) - Oncology Imaging (techniques 	9 th - 12 th	8

		& Findings and Interpretation)		
6	Chapter 5: Principles of Nuclear Medicine Therapy	<ul style="list-style-type: none"> - Treatment Administration. - Therapy Radiopharmaceuticals - Dose Fractionation in Radiotherapy. 	13 th	2
7	Chapter6: Nuclear Radiation Dosimetry and Safety	<ul style="list-style-type: none"> - Radiation Dosimetry - Patient Dose Computation Methods - Monte Carlo Simulation of Radiation Transport - Radiation Safety 	14 th - 15 th	4
8	Final exam	Final exam	16 th	2
Total number of weeks and hours			16	32

Second: Practical/Tutorial/Clinical Aspects			
No.	Practical/Tutorial/Clinical topics	Week due	Contact Hours
1	Radioactivity and radiation protection	2 nd	2
2	System Calibration: Linearity and Resolution	3 rd , 4 th	4
3	γ -Radiation Absorption	5 th	2
4	Absorbed radiation dose	6 th	2
5	Photonuclear cross-section and Compton Scattering	7 th	2
6	Spatial Resolution of Gamma camera	8 th , 9 th	4
7	Monte Carlo Simulation of Radiation Transport and dosimetry.	10 th -12 th	6
8	Radioactivity and radiation protection	13 th	2
	Final Practical exam	14 th	2
Total number of weeks and hours		13	26