

# Course Specification (2025)

## 1. Basic Information

Course Title (according to the bylaw)	Nuclear Physics II			
Course Code (according to the bylaw)	207			
Department/s participating in delivery of the course	-			
Number of credit hours of the course (according to the bylaw)	<b>Theoretical</b>	<b>Practical</b>	<b>Other (specify)</b>	<b>Total</b>
	1	4	-	3
Course Type	Compulsory			
Academic level at which the course is taught	Level 2 – 2nd Semester			
Academic Program	Technology of Radiology and Medical Imaging			
Institute	High Technology Institute of Applied Health Science			
Academy	Nile delta for science			
Name of Course Coordinator				
Course Specification Approval Date	2024 - 9 - 21			
Course Specification Approval (Attach the decision/minutes of the department /committee/council ....)				

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## 2. Course Overview (Brief summary of scientific content)

This course provides a foundational understanding of nuclear physics as it applies to medical imaging and therapy, emphasizing the role of radionuclides in diagnosing and treating a range of conditions. Students will explore the basic mechanisms and procedures involved in nuclear medicine imaging across various body systems, while also learning essential safety and handling practices for radioactive materials. The course prepares learners for more advanced clinical training in nuclear medicine.

## 3. Course Learning Outcomes CLOs

### Matrix of course learning outcomes CLOs with program outcomes POs (NARS/ARS)

Program Outcomes (NARS/ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
POs 1	Gain knowledge of the hazards of radioactive substances and radiation, radiation protection for the safety of patients and healthcare workers.	CLOs1	Explain basic nuclear physics concepts related to radioactive decay and interaction with matter.
	Discuss the fundamentals of instrumentation components, imaging protocols, techniques and quality assurance used in different imaging modalities.	CLOs2	Describe the principles and applications of nuclear medicine imaging techniques.
		CLOs3	Identify the uses of specific radiopharmaceuticals for diagnostic and therapeutic purposes.

<b>Program Outcomes (NARS/ARS)</b> (according to the matrix in the program specs)		<b>Course Learning Outcomes</b> Upon completion of the course, the student will be able to:	
<b>Cod e</b>	<b>Text</b>	<b>Code</b>	<b>Text</b>
	Understand mathematical and physics principles to grasp the fundamental properties of radiation and accurately orient patients for X-rays, 3-D CT imaging, ultrasounds	<b>CLOs4</b>	Understand radiation safety protocols and handling procedures in nuclear medicine.
<b>POs 2</b>	Adapt to new technologies and advancements	<b>CLOs1</b>	Analyze the suitability of different imaging modalities for various clinical cases.
		<b>CLOs2</b>	Interpret basic nuclear medicine imaging results for skeletal, cardiac, pulmonary, neurological, and endocrine systems.
		<b>CLOs3</b>	Solve clinical problems involving radiopharmaceutical selection and imaging protocols.
		<b>CLOs4</b>	Evaluate the effectiveness and limitations of nuclear imaging in disease diagnosis.
<b>POs 3</b>	Operate and manage effectively the different medical imaging equipment and practice the professional fieldwork	<b>CLOs1</b>	Apply basic nuclear medicine imaging protocols safely and correctly.
		<b>CLOs2</b>	Assist in preparing patients for nuclear medicine procedures.
		<b>CLOs3</b>	Follow proper radiation safety practices during imaging and therapy.
		<b>CLOs4</b>	Document nuclear medicine

<b>Program Outcomes (NARS/ARS)</b> (according to the matrix in the program specs)		<b>Course Learning Outcomes</b> Upon completion of the course, the student will be able to:	
			procedures and patient observations accurately.
<b>POs 4</b>	Follow regulation in ethical practice and the rules of healthcare organizations.  Adjust to new technologies and methods.	<b>CLOs1</b>	Communicate effectively with healthcare teams about nuclear medicine procedures.
		<b>CLOs2</b>	Demonstrate teamwork during nuclear imaging sessions and clinical discussions.
		<b>CLOs3</b>	Manage time and prioritize tasks efficiently during imaging and reporting activities.
		<b>CLOs4</b>	Maintain professionalism, safety, and ethical standards in all clinical settings.

## 4. Teaching and Learning Methods

1. Interactive Lectures.
2. Discussion and brain storming.
3. Asynchronous learning.
4. Case study /problem solving.
5. Self-Directed Learning (SDL).
6. Research and presentations, Assignment and reports.
7. Practical Learning

## 5. Course Schedule

Number of the Week	Scientific content of the course (Course Topics)	Total Weekly Hours	Expected number of the Learning Hours			
			Theoretical teaching (lectures/discussion groups/ .... ..)	Training (Practical/Clinical/ ..... .)	Self-learning (Tasks/Assignments/ Projects/ .. .)	Other (to be determined)
1	Introduction to Nuclear Physics	3	1	4	-	-
2	Basics of Nuclear Medicine	3	1	4	-	-
3	Skeletal Scanning	3	1	4	-	-
4	Lung Scanning: V/Q Scanning	3	1	4	-	-
5	Cardiovascular Scanning: Myocardial Perfusion Imaging	3	1	4	-	-
6	<b>Med-term exam</b>					
7	Cardiovascular Scanning: Radionuclide Ventriculography	3	1	4	-	-
8	Brain Imaging: Brain Perfusion	3	1	4	-	-
9	Brain Imaging: Brain Tumor Imaging	3	1	4	-	-
10	Endocrine Scanning: Thyroid Scanning	3	1	4	-	-

11	Endocrine Scanning: Parathyroid Scan	3	1	4	-	-
12	Endocrine Scanning: Adrenals MIBG Scan	3	1	4	-	-
13	Radioiodine Therapy	3	1	4	-	-
14	<b>Revision</b>					
15	<b>Practical guide</b>					
16	<b>Final exam</b>					

## 6. Methods of students' assessment

No .	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Final Written Exam	15	100	66.7%
2	Final Practical Exam	14	30	20%
3	Assignments / Project /Portfolio/ Logbook	6	20	13.3%

## 7. Learning Resources and Supportive Facilities \*

<b>Learnin g resource s (books, scientifici</b>	<b>The main (essential) reference for the course</b> (must be written in full according to the scientific documentation method)	Nuclear Medicine Physics – Richard L. Wahl
	<b>Other References</b>	Physics in Nuclear Medicine – Simon R. Cherry, James A. Sorenson, Michael E. Phelps

<b>c referenc es, etc.) *</b>		Latest guidelines from the Society of Nuclear Medicine and Molecular Imaging (SNMMI)
	<b>Electronic Sources</b> (Links must be added)	Radiopaedia.org Knowledge bank: <a href="https://www.ekb.eg/ar">https://www.ekb.eg/ar</a>
	<b>Learning Platforms</b> (Links must be added)	<a href="https://bislms.mans.edu.eg/">https://bislms.mans.edu.eg/</a>
	<b>Other</b> (to be mentioned)	
<b>Supporti ve facilities &amp; equipme nt for teaching and learning *</b>	<b>Devices/Instruments</b>	Computers, Boards and Projectors
	<b>Supplies</b>	
	<b>Electronic Programs</b>	Ibn Al-Haytham Program
	<b>Skill Labs/ Simulators</b>	
	<b>Virtual Labs</b>	
	<b>Other (to be mentioned)</b>	Computers, Boards and Projectors

**\* The list mentioned is an example, the institution may add and/or delete depending on the nature of the course**

**Name and Signature**

**Course Coordinator**

Prof/Dr.Emad El-  
Shourbagy

**Name and Signature**

**Program Coordinator**

**Dr/ Amira Atef**