

Course Specification

(2025)

1. Basic Information

Course Title (according to the bylaw)	Nuclear Physics I			
Course Code (according to the bylaw)	TRMI 201			
Department/s participating in delivery of the course	Technology of Radiology and Medical Imaging			
Number of credit hours/points of the course (according to the bylaw)	Theoretical	Practical	Other (specify)	Total
	1	3	-	4
Course Type	Compulsory			
Academic level at which the course is taught	Level 2– 1 st Semester			
Academic Program	Technology of Radiology and Medical Imaging			
Faculty/Institute	High Technology Institute of Applied Health Science			
University/Academy	Nile Delta for science			
Name of Course Coordinator	Dr. Amira Atef, Lecturer of Biology Radiation Science , High			

	Technology Institute of Applied Health Science
Course Specification Approval Date	Department Council No. 2, date: (21 – 09 – 2024)
Course Specification Approval (Attach the decision/minutes of the department /committee/council)	

2. Course Overview (Brief summary of scientific content)

This course provides the student with the physical principle of nuclear medicine and equipment used for imaging and dose measurements.

3. Course Learning Outcomes CLOs

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

Program Outcomes (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
Pos1	Understand and deal with the - .interdisciplinary sciences	CLOs1	Learn about the introduction of - nuclear medicine
Pos2	Study human anatomy and - pathology to understand the physiological basis of the	CLOs2	Defined what it is basic nuclear - medicine
		CLOs3	learn radiation, atom emission - radionuclide, nuclide, isotopes, isobars and isotones

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Cod e	Text	Code	Text
Pos3	.images Gain knowledge of the - hazards of radioactive substances and radiation, radiation protection for the safety of patients and .healthcare workers	CLOs5	-Understand the of Radiopharmaceutical -Explain basic nuclear physics concepts related to radioactive decay and interaction with matter
		CLOs6	-Identify advantage and disadvantage of nuclear medicine
Pos4	Understand mathematical - and physics principles to grasp the fundamental properties of radiation and accurately orient patients for X-rays, 3-D CT imaging, ultrasounds and .MRI		
Pos5	Use computers and software -	CLOs7	Analyze test results of Interaction of -
Pos6	.to analyze problems		Radiation with Matter (B.1.)
Pos7	Realize some basic concepts - .of human rights	CLOs8	Explain the importance Factor - affecting radiopharmaceuticals

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Cod e	Text	Code	Text
Pos8	Utilize suitable information - and communication technology to collect, convey, and enhance the performance and reconstruction of medical .images Adapt to new technologies - and advancements in medical .imaging	CLOs9	Operate artificial producing - radio nuclides
		CLOs10	Employ radiation Safety - Aspects in Nuclear Medicine
		CLOs11	Solve clinical problems - involving radiopharmaceutical .selection and imaging protocols
			Interpret illustrate imaging concepts
Pos9	Operate and manage - effectively the different medical imaging equipment and practice the professional .fieldwork	CLOs12	Suggestions for radiology devices - used for nuclear medicine
Pos10		CLOs13	Apply scientific methods for devices - used in imaging
		CLOs13	Demonstrate principle of -

Program Outcomes (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
	practice and the rules of healthcare organizations		
Pos14	Adjust to new technologies- .and methods	CLOs17	-Demonstrate teamwork during nuclear imaging sessions and clinical discussions (D.3., D.4.)
Pos15	Commit to learning, - attending workshops & field .training	CLOs18	-Manage time and prioritize tasks efficiently during imaging and reporting activities. (D.5., D.6.)
Pos16	Participate in teamwork - harmoniously and exhibit collaboration with colleagues and other health .care professionals	CLOs19	-Maintain professionalism, Safety and ethical standards in all clinical settings (D.7., D.8.)
Pos17	Conduct research - projects with a sense of .social responsibility		
Pos18	Practice professionalism in - .all aspects of the work		

Program Outcomes (ARS) (according to the matrix in the program specs)		Course Learning Outcomes Upon completion of the course, the student will be able to:	
Cod e	Text	Code	Text

4. Teaching and Learning Methods

1. Interactive Lectures.
2. Discussion Asynchronous learning.
3. Case study
4. Self-Directed Learning (SDL).
5. Assignment and reports.

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	3	1	3	1	-
2	Defined of nuclear medicine/advantage, disadvantages , Risks,	3	1	3	1	-
3	Basic Nuclear Medicine/Terminology/Artificial producing radio nuclides	3	1	3	1	-
4	Matter and Energy/Electromagnetic radiations, Particulate radiations/Electronic Structure of the Atom, Nuclear Binding Energy and Auger electrons	3	1	3	1	-
5	Interaction of Radiation with Matter, Interaction of Charged Particles with Matter and Interaction of γ -	3	1	3	1	-

	Radiations with Matter					
6	Mid-Term Exam					
7	-Mod of decay/excess nuclear mass, unstable neutron-proton ratio and appropriate number of nucleon but excess nuclear energy	3	1	3	1	-
8	Imaging general concepts/principle of image detection/gamma camera and type of gamma cameras	3	1	3	1	-
9	Radiation dosimeter/ Deterministic effects and Stochastic effects	3	1	3	1	-
10	Radiation Safety Aspects in Nuclear Medicine					-
11	THE HISTORY OF RADIATION/ CHARACTERISTICS OF BETA RADIATION	3	1	3	1	-

Methods of students' assessment

12	radionuclide, nuclide, isotope, isobar, isotones and isomers	3	1	3	1	-
13	Principle of radiation protection/ Area control activities	3	1	3	1	-
14	Reinvasion	3	1	3	1	
15	Practical Exam					
16	Final exam					

5. Methods of students' assessment

No .	Assessment Methods *	Assessment Timing (Week Number)	Marks/ Scores	Percentage of total course Marks
1	Exam 1written (Semester work)	-	-	-
2	Exam 2..... (Semester work)	6	20	13.3%
3	Final Written Exam	15	75	50%
	Final Practical/Clinical/... Exam	14	45	30%
	Final Oral Exam	-	-	-
	Assignments / Project /Portfolio/ Logbook	6	10	6.6%
	Field training	-	-	-
	Other (Mention)	-	-	-

*** The methods mentioned are examples, the organization may add and/or delete**

6. Learning Resources and Supportive Facilities *

Learning resources (books, scientific references, etc.) *	The main (essential) reference for the course (must be written in full according to the scientific documentation method)	Paul E. Christian, Kristen M. Waterstram-Rich. Nuclear medicine and PET/CT technology and techniques ,seventh edition.2012
	Other References	International atomic energy Agency. Nuclear medicine physics handbook for teachers and students.2015 https://www.pub.iaea.org
	Electronic Sources (Links must be added)	:Knowledge bank https://www.ekb.eg/ar
	Learning Platforms (Links must be added)	/https://bislms.mans.edu.eg
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and	Devices/Instruments	Computer- boards and projectors
	Supplies	-
	Electronic Programs	Ibn al-Haytham program
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

learning		
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*** 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
 Dr/Amira Atef

Name and Signature
Program Coordinator

 Dr/Amira Atef