

Course Specification

(2025)

1. Basic Information

Course Title (according to the bylaw)	Radiation Techniques II			
Course Code (according to the bylaw)	TRMI 408			
Department/s participating in delivery of the course	Technology of Radiology and Medical Imaging			
Number of credit hours of the course (according to the bylaw)	Theoretical	Practical	Other (specify)	Total
	2	2	-	3
Course Type	Compulsory			
Academic level at which the course is taught	Level 4 – 2 nd Semester			
Academic Program	Technology of Radiology and Medical Imaging			
Institute	High Technology Institute of Applied Health Sciences			
Academy	Nile Delta for sciences			
Name of Course Coordinator	Dr. Amira Atef, doctor lecturer of			

	Biology Radiation Science Institute of 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 will provide the students with the fundamentals of radiation physics and radiobiology students will be trained to deal with machines of radiation safety and effectively. Basics of radiation technology are illustrated including preparation of radiation sessions under supervision of the radiotherapist. Patient observation during sessions and doctor notification when detecting problems. Some knowledge disease treated with radiation will be introduced

3. Course Learning Outcomes CLOs

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

Program Outcomes (POs = sub-competences)(ARS) (according to the matrix in the program specs)		Course Learning Outcomes (CLOs) Upon completion of the course, the student will be able to:	
Cod e	Text	Code	Text
POs1 .1.3 POs1 .1.4	Understand the - comprehensive knowledge of nuclear physics, plain radiographic techniques, ultrasound, CT, MRI, contrast media, bone densitometry, radiation techniques, pediatric imaging, dental radiology, interventional and cardiovascular techniques	CLOs1 CLOs2 CLOs3 CLOs4 CLOs5 CLOs6	-Tell about the concepts of Definition of radiation therapy Recorded what types of radiotherapy if external or internal radiation. -Describes how radiation therapy works against cancer. State types of beams used in radiation therapy -List Classification types of external beam radiation therapy -Tell about 3-D conformal radiation therapy, Intensity-modulated radiation and Image--guided radiation therapy -State different ways of delivering the total radiation dose -Describes Quantities used in describing Photon beam, as and photon fluence rate -Understand Characteristics of Photon Beams Tell about Radiation Treatment - Parameters/Radiation beam field size
	Interpret anatomical -		
	structure, pathological		

Program Outcomes (POs = sub-competences)(ARS) (according to the matrix in the program specs)		Course Learning Outcomes (CLOs) Upon completion of the course, the student will be able to:	
Cod e	Text	Code	Text
	findings and imaging data utilizing radiological information systems		
POs1 .2.1 POs1 .2.2	Use computers and - software in medical imaging effectively	CLOs9 CLOs10 CLOs11	-Analyze how radiation kill cancer and damage their DNA Categorize factor which depended on it what type used in treatment -Compare between type of beam used in radiation therapy and show how produced x-ray by Bremsstrahlung and Characteristic photons -Analyze how 3-D conformal radiation therapy, Intensity-modulated radiation and Image-guided radiation therapy (IGRT) them work to treat cancer and showing the

Program Outcomes (POs = sub-competences)(ARS) (according to the matrix in the program specs)		Course Learning Outcomes (CLOs) Upon completion of the course, the student will be able to:	
Code	Text	Code	Text
	Apply quality control - measures to ensure test accuracy and reliability		
POs2 .1.1	Exhibit appropriate - professional behaviors and relationships in all aspects of medical	CLOs17 CLOs18	-Apply Radiation Therapy to treat Cancer -Apply external and internal radiation therapy

Program Outcomes (POs = sub-competences)(ARS) (according to the matrix in the program specs)		Course Learning Outcomes (CLOs) Upon completion of the course, the student will be able to:	
Cod e	Text	Code	Text
POs2 .1.2	imaging practice		
POs2 .1.3	Ensure confidentiality, - privacy of patients' information, comfort, preparation and ethical standards in all radiology .procedures	CLOs19	-Apply use orthovoltage x-rays and megavoltage in external radiotherapy technique
POs2 .1.4	Practice in an ethical - and professional manner consistent with relevant legislation and regulatory requirements in medical	CLOs20	- Interpret practice of 3-D conformal radiation therapy, Intensity-modulated radiation and Image-guided radiation therapy
		CLOs21	Apply each of hyperfractionation and hypofractionation to delivering the total radiation dose
		CLOs22	Integrate between work of photon fluence and photon fluence rate to make describing for photon beam
		CLOs23 CLOs16	-Apply Filtration on intensity and penetration of beam -Apply Mathematics of Attenuation-

Program Outcomes (POs = sub-competences)(ARS) (according to the matrix in the program specs)		Course Learning Outcomes (CLOs) Upon completion of the course, the student will be able to:	
Cod e	Text	Code	Text
POs3 .1.1 POs3 .1.3 POs3 .1.5 POs3 .1.6	-Perform, maintain and evaluate routine and advanced diagnostic imaging procedures (x-ray, ultrasound and nuclear medicine)		
		CLOs17	-Influences and interacts well with others in the workplace
		CLOs18	-High efficiency in problem-solving procedures at the individual or institutional level.
	-Apply radiation dose optimization and image quality control techniques.	CLOs19	-Attention to detail

Program Outcomes (POs = sub-competences)(ARS) (according to the matrix in the program specs)		Course Learning Outcomes (CLOs) Upon completion of the course, the student will be able to:	
Cod e	Text	Code	Text
	-Apply standard procedures in Contrast Media, bone densitometry, CT and MRI		

4. Teaching and Learning Methods

1. Interactive Lectures
2. Discussion Case study
3. Self-Directed Learning (SDL)
4. Practical Learning

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 of Radiation Technique II	3	2	2	-	-
2	Defined radiation therapy to treat cancer/ How radiation therapy works against cancer	3	2	2	-	-
3	Types of radiation therapy, external beam and internal radiation therapy	3	2	1	1	-
4	(brachytherapy)./ Factors which type of radiation choose deepened on it	3	2	1	1	-
5	Types of beams used in radiation therapy/Bremsstrahlung and Characteristic photons/Orthovoltage x-rays and Megavoltage	3	2	2	-	-

6	Mid-term					
7	Types of external beam radiation therapy/3-D conformal radiation therapy	3	2	1	1	-
8	/Intensity-modulated radiation therapy (IMRT)/	3	2	1	1	-
9	Image-guided radiation therapy (IGRT)	3	2	2	-	-
10	Different ways of delivering the total radiation dose /Quantities used in describing Photon	3	2	2	-	-
11	Beam(Photon fluence & photon fluence rate	3	2	2	-	-
12	Exposure, Absorbed dose, The unit of absorbed dose and Calorimetry	3	2	1	1	-
13	Characteristics of Photon Beams/Attenuation Coefficients, Linear attenuation	3	2	1	1	-

	coefficient (μ) and Mass attenuation coefficient					
14	Mathematics of Attenuation/half-value layer & PHOTON BEAM SOURCES/Monoenergetic and Poly-energetic (Spectral) Beams/(1)	3	2	1	1	-
15	Mathematics of Attenuation/half-value layer & PHOTON BEAM SOURCES/Monoenergetic and Poly-energetic (Spectral) Beams/ (2)	3	2	2	-	-
16	Practical exam					
17	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	Mid- term	6	10	6.6%
3	Final Written Exam	17	100	66.6%
4	Final Practical/Clinical/... Exam	16	30	20%
5	Final Oral Exam	-	-	-
6	Assignments / Project /Portfolio/ Logbook	6	10	6.6%
7	Field training	-	-	-
8	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)	Jennifer R, Bellon julia S,Wong Shannon M. Macdonald Alice Y. Radiation therapy techniques and treatment planning for breast cancer.2016
	Other References	Jennifer R B, Julia S W, Shannon M M & Alice Y H.2016. Radiation Therapy Techniques and Treatment Planning for Breast Cancer https://link.springer.com
	Electronic Sources	:Knowledge bank

	(Links must be added)	https://www.ekb.eg/ar
	Learning Platforms (Links must be added)	Bislms.mans.edu.eg https://bislms.mans.edu.eg/moodle2025/course/index.php?categoryid=9
	Other (to be mentioned)	-
Supportive facilities & equipment for teaching and learning *	Devices/Instruments	Computer- boards and projectors
	Supplies	-
	Electronic Programs	Ibn al-Haytham program
	Skill Labs/ Simulators	-
	Virtual Labs	-
	Other (to be mentioned)	-

*** 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

