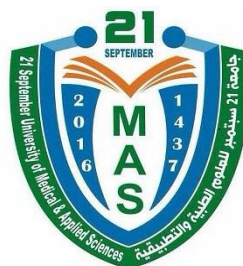


Republic of Yemen
Ministry of Education & Higher Research
Council of Academic Accreditation & Quality Assurance of
Higher Education (CAQA)



**21 september University of Medical
and Applied Science**



Faculty of Applied Medical Science

Department of **Medical Radiology and Imaging Technology**

Program of Radiologic Technology and Medical Imaging

Course Specification of

Radiologic Therapy

Course Code. (____)

2024



T4: This Template is Developed and Approved by CAQA-Yemen, 2023

Prepared by:

Reviewed by:

Dr. -----

Head of the Department:

Dr. Awadh Al-Kubati

Quality Unit:

Dr. Mohammed
Al-shamahi

Dean:

Dr. Abdulsalam
Dalaq

I. General Information:

1.	Course Title:	Radiologic Therapy			
2.	Course Code:				
3.	Credit Hours:	Credit Hours	Theory Contact Hours		Practical Contact Hours
			Lecture	Tutorial/ Seminar	Lab Clinical
		2	2	--	--
4.	Level/ Semester at which this Course is offered:	4 th Level / 2 nd Semester			
5.	Pre –Requisite (if any):				
6.	Co –Requisite (if any):	None			
7.	Program (s) in which the Course is Offered:	Bachelor of Radiologic Technology and Medical Imaging			
8.	Language of Teaching the Course:	English			
9.	Location of Teaching the Course:	Faculty of Applied Medical Science			
10.	Prepared by:				
11.	Date and Number of Approval by Council:				

II. Course Description:

The Radiologic Therapy course provides students with in-depth theoretical knowledge about the use of radiation in treating various diseases, especially cancer. Topics include radiation physics, radiation biology, treatment planning, safety protocols, and the principles of different therapeutic techniques. Students will explore advanced and emerging radiation therapies, focusing on the role of the radiologic technologist in ensuring effective and safe treatment.

III. Course Intended Learning Outcomes (CILOs) :

Referenced PILOs

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Upon successful completion of the course, students will be able to:				
A. Knowledge and Understanding:		I, P or M/A		
a1	Understand the principles and types of radiologic therapy.	I	A2	Explanation of the principles and procedures of medical imaging acquisitions, medical imaging technique and Radiological Technology Sciences as well as patient positioning in computed radiography and MRI technique.
a2	Explain the role of radiation therapy in cancer and other diseases treatment.	I	A1	Demonstrate an understanding of fundamental knowledge of Biomedical sciences (Biology, Biophysics, Anatomy, Physiology, Sectional anatomy and medical imaging technique).
B. Intellectual Skills:				
b1	Analyze various radiologic therapy techniques for medical conditions.	I	B3	Analyze and evaluate evidence-based information needed in medical imaging practice.
b2	Evaluate the effectiveness of therapy modalities in clinical scenarios.	I	B1	Assessment of the radiation exposure times and intensity of exposure to guarantee the imaging technique is accurate to reduce the risk factors and adapt to patient needs.
C. Professional and Practical skills:				
c1				
c2				
D. Transferable Skills:				
d1	Communicate treatment principles effectively in professional settings.	M	D1	Communicate effectively with clinicians, patients, and support staff.

d2	Apply critical thinking in analyzing and proposing therapeutic techniques.	M	D4	Function effectively as an individual, as a member, or leader of a team engaged in appropriate activities to the radiologic technology disciplines to accomplish a common goal.
I= Introduced, P=Practiced or M/A= Mastered/Advanced				

(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:			
Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
a1	Understand the principles and types of radiologic therapy.	- Lectures on the history, types, and applications of radiologic therapy. - Class discussions to explore key concepts and applications	- Quizzes, - Midterm and final written exams
a2	Explain the role of radiation therapy in cancer and other diseases treatment.	- Case studies on cancer treatment scenarios. - Interactive lectures to explore specific treatment modalities	- Case study report - Quizzes - Midterm and final written exams
(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:			
Course Intended Learning Outcomes		Teaching Strategies	Assessment Strategies
b1	Analyze various radiologic therapy techniques for medical conditions.	- Group discussions on the effectiveness of different therapy techniques. - Analysis of clinical examples	- Quizzes - Midterm and final written exams
b2	Evaluate the effectiveness of therapy modalities in clinical scenarios.	- Problem-solving activities involving hypothetical treatment scenarios. - Class discussions on advanced and	- Midterm and final written exams - Case study report

		emerging radiologic therapies.	
(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
c1		▪	▪
c2		▪	▪
(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:			
	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
d1	Communicate treatment principles effectively in professional settings.	- Group projects to simulate interdisciplinary team communication. - Scenario-based critical thinking exercises to address specific clinical challenges.	Group projects report
d2	Apply critical thinking in analyzing and proposing therapeutic techniques.	Assignments focused on designing and evaluating treatment plans.	

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Introduction to Radiologic Therapy	– Definition, history, and types of therapy; indications and applications.	1	2	a1, a2
2	Basics of Radiation Physics	– Types of radiation, energy principles, interaction of radiation with matter.	1	2	a1
3	Radiation Biology	– Effects of radiation on human tissue, radiation	1	2	a2, b1

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No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
		sensitivity, biological repair mechanisms.			
4	External Beam Therapy	– Types, equipment, and principles of linear accelerators; treatment techniques.	1	2	a1, b1
5	Brachytherapy	– Principles, equipment, and techniques; comparison with external beam therapy.	1	2	a2, b2
6	Radiation Protection	– Shielding, safety standards, and protocols for radiologic therapists and patients.	1	2	a2, d1
7	Mid-term Exam	– All Previous topics	1	2	a1, a2, b1, b2, c1
8	Treatment Planning in Radiologic Therapy	– Dosimetry, target volume delineation, and optimization techniques.	1	2	b1, d2
9	Radiotherapy for Head and Neck Cancers	– Anatomical considerations, challenges, and specific treatment protocols.	1	2	a2, b2
10	Radiotherapy for Thoracic and Abdominal Cancers	– Treatment planning for lung, breast, liver, and gastrointestinal cancers.	1	2	a2, b2
11	Advanced Techniques in Radiologic Therapy	– Proton therapy, stereotactic radiosurgery, and heavy ion therapy.	1	2	a1, b1
12	Pediatric Radiologic Therapy	– Challenges, special considerations, and safety measures for children.	1	2	a2, d1
13	Side Effects of Radiation Therapy	– Short-term and long-term side effects; management strategies.	1	2	a2, d2
14	Radiologic Therapy in Combined Treatments	– Integration with chemotherapy, surgery, and other modalities.	1	2	b2, d2
15	Future Directions in Radiologic Therapy	– Emerging trends, AI in radiotherapy, and personalized radiation treatment approaches.	1	2	a1, b2

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
16	Final Exam	– All topics	1	2	a1, a2, b1, b2
Number of Weeks /and Units Per Semester			16	32	

B. Practical Aspect (Lab/Clinical) (if any):

No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	None			
2				
Number of Weeks /and Units Per Semester		11	22	

C. Tutorial Aspect (if any):

No.	Tutorial	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	None			
2				
3				
Number of Weeks /and Units Per Semester				

VII. Teaching Strategies:

- Lectures
- Case Studies
- Group Discussions
- Problem-Solving Exercises
- Presentations

VII. Assessment Methods:

- Midterm Written Exam

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Dr. -----

Head of the Department:

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Al-shamahi

Dean:

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Dalaq

- Quizzes
- Case Study Report
- Final Written Exam
- Group Presentation

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1				
2				
Total			10	

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Quiz 1: Basics of Radiologic Therapy	Week 3	5	5%	a1, a2
2	Midterm Written Exam	Week 7	10	10%	a2, a2, b1, b2
3	Quiz 2: Radiation Therapy Techniques	Week 10	5	5%	b1, b2
4	Case Study Report: Treatment Planning Analysis	Week 12	10	10%	a2, d2
5	Final Written Exam	Week 14	70	70%	a2, a2, b1, b2
Total			100	100 %	

IX. Learning Resources:

1- Required Textbook(s) (maximum two):

- 1- Charles M. Washington, Dennis T Leaver, 2015, Principles and Practice of Radiation Therapy, Elsevier Health Sciences
- 2- Todd Pawlicki, FAAPM., Daniel J. Scanderbeg, George Starkschall, 2016, Hendee's Radiation Therapy Physics, John Wiley & Sons, Inc.

2- Essential References:

- 1- Faiz M. Khan, 2012, The Physics of Radiation Therapy, Lippincott Williams & Wilkins.
- 2- John P. Gibbons, 2019, Khan's The Physics of Radiation Therapy 6th Edition, LWW
- 3- Borislav Hristov, Steven H Lin, John P. Christodouleas, 2018, Radiation Oncology: A Question-Based Review 3rd Edition, LWW
- 4- Edward C. Halperin, David E. Wazer, Carlos A. Perez, 2018, Principles and Practice of Radiation Oncology, 7th Edition, LWW.

3- Electronic Materials and Web Sites etc.:

Electronic Materials and Websites

- www.radiologyinfo.org
- www.rtanswers.org

X. Course Policies: (Based on the Uniform Students' By law (2007))

1	Class Attendance: Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	Tardiness: A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
4	Assignments & Projects: Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	Cheating: Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	Forgery and Impersonation: Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	Other policies: The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.
3	Exam Attendance/Punctuality: No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.

Faculty of Applied Medical Science

Department of **Medical Radiology and Imaging Technology**

Program of Radiologic Technology and Medical Imaging

Course Plan (Syllabus) of

Radiologic Therapy

Course Code.

I. Information about Faculty Member Responsible for the Course:						
Name of Faculty Member:		Office Hours				
Location & Telephone No.:	-----					
E-mail:	--@--.	SAT	SUN	MON	TUE	WED THU

2024/2025

Prepared by:

Reviewed by:
Dr. -----

Head of the Department:
Dr. Awadh Al-Kubati

Quality Unit:
Dr. Mohammed
Al-shamahi

Dean:
Dr. Abdulsalam
Dalaq

I. General Information:

12.	Course Title:	Radiologic Therapy			
13.	Course Code:				
14.	Credit Hours:	Credit Hours	Theory Contact Hours		Practical Contact Hours
			Lecture	Tutorial/ Seminar	Lab Clinical
		2	2	--	-- --
15.	Level/ Semester at which this Course is offered:	4 th Level / 2 nd Semester			
16.	Pre –Requisite (if any):				
17.	Co –Requisite (if any):	None			
18.	Program (s) in which the Course is Offered:	Bachelor of Radiologic Technology and Medical Imaging			
19.	Language of Teaching the Course:	English			
20.	Location of Teaching the Course:	Faculty of Applied Medical Science			
21.	Prepared by:				
22.	Date and Number of Approval by Council:				

II. Course Description:

The Radiologic Therapy course provides students with in-depth theoretical knowledge about the use of radiation in treating various diseases, especially cancer. Topics include radiation physics, radiation biology, treatment planning, safety protocols, and the principles of different therapeutic techniques. Students will explore advanced and emerging radiation therapies, focusing on the role of the radiologic technologist in ensuring effective and safe treatment.

III. Course Intended Learning Outcomes (CILOs) :

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

A. Knowledge and Understanding:

- | | |
|----|---|
| a1 | Understand the principles and types of radiologic therapy. |
| a2 | Explain the role of radiation therapy in cancer and other diseases treatment. |

B. Intellectual Skills:

- | | |
|----|---|
| b1 | Analyze various radiologic therapy techniques for medical conditions. |
| b2 | Evaluate the effectiveness of therapy modalities in clinical scenarios. |

C. Professional and Practical skills:

- | | |
|----|--|
| c1 | |
| c2 | |

D. Transferable Skills:

- | | |
|----|--|
| d1 | Communicate treatment principles effectively in professional settings. |
| d2 | Apply critical thinking in analyzing and proposing therapeutic techniques. |

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	Introduction to Radiologic Therapy	– Definition, history, and types of therapy; indications and applications.	1	2
2	Basics of Radiation Physics	– Types of radiation, energy principles, interaction of radiation with matter.	1	2
3	Radiation Biology	– Effects of radiation on human tissue, radiation sensitivity, biological repair mechanisms.	1	2
4	External Beam Therapy	– Types, equipment, and principles of linear accelerators; treatment techniques.	1	2

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
5	Brachytherapy	– Principles, equipment, and techniques; comparison with external beam therapy.	1	2
6	Radiation Protection	– Shielding, safety standards, and protocols for radiologic therapists and patients.	1	2
7	Mid-term Exam	– All Previous topics	1	2
8	Treatment Planning in Radiologic Therapy	– Dosimetry, target volume delineation, and optimization techniques.	1	2
9	Radiotherapy for Head and Neck Cancers	– Anatomical considerations, challenges, and specific treatment protocols.	1	2
10	Radiotherapy for Thoracic and Abdominal Cancers	– Treatment planning for lung, breast, liver, and gastrointestinal cancers.	1	2
11	Advanced Techniques in Radiologic Therapy	– Proton therapy, stereotactic radiosurgery, and heavy ion therapy.	1	2
12	Pediatric Radiologic Therapy	– Challenges, special considerations, and safety measures for children.	1	2
13	Side Effects of Radiation Therapy	– Short-term and long-term side effects; management strategies.	1	2
14	Radiologic Therapy in Combined Treatments	– Integration with chemotherapy, surgery, and other modalities.	1	2
15	Future Directions in Radiologic Therapy	– Emerging trends, AI in radiotherapy, and personalized radiation treatment approaches.	1	2
16	Final Exam	– All topics	1	2
Number of Weeks /and Units Per Semester			16	32

B. Practical Aspect (Lab/Clinical) (if any):

No.	Tasks/ Experiments	Number of Weeks	Contact Hours
1	None		
2			

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No.	Tasks/ Experiments	Number of Weeks	Contact Hours
3			
4			
5			
6			
7			
8			
9			
10			
15			
Number of Weeks /and Units Per Semester		11	22

C. Tutorial Aspect (if any):

No.	Tutorial	Number of Weeks	Contact Hours
1	None		
2			
3			
Number of Weeks /and Units Per Semester			

VII. Teaching Strategies:

- Lectures
- Case Studies
- Group Discussions
- Problem-Solving Exercises
- Presentations

VII. Assessment Methods:

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- Midterm Written Exam
- Quizzes
- Case Study Report
- Final Written Exam
- Group Presentation

VII. Assignments:

No.	Assignments	Week Due	Mark
1			
2			
Total			10

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	Quiz 1: Basics of Radiologic Therapy	Week 3	5	5%
2	Midterm Written Exam	Week 7	10	10%
3	Quiz 2: Radiation Therapy Techniques	Week 10	5	5%
4	Case Study Report: Treatment Planning Analysis	Week 12	10	10%
5	Final Written Exam	Week 14	70	70%
Total			100	100 %

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2- Essential References:

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1. Faiz M. Khan, 2012, The Physics of Radiation Therapy, Lippincott Williams & Wilkins.
2. John P. Gibbons, 2019, Khan's The Physics of Radiation Therapy 6th Edition, LWW
3. Borislav Hristov, Steven H Lin, John P. Christodouleas, 2018, Radiation Oncology: A Question-Based Review 3rd Edition, LWW
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7	Other policies: The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.
3	Exam Attendance/Punctuality: No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.