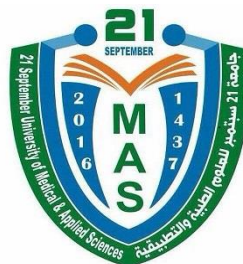


Republic of Yemen
Ministry of Education & Higher Research
Council of Academic Accreditation & Quality Assurance of
Higher Education (CAQA)



**21 septamber 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
Radiographic Imaging Principles
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:	Radiographic Imaging Principles				
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:	2 nd Level / 1 st 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:

This course provides an in-depth understanding of the principles and techniques of radiographic imaging. Topics include the physics of radiographic imaging, equipment operation, image production, quality control, and radiation safety. The course emphasizes practical skills and clinical applications, preparing students for advanced diagnostic imaging techniques.

III. Course Intended Learning Outcomes (CILOs) :

Referenced PILOs

Prepared by:

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Al-shamahi

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Dalaq

Upon successful completion of the course, students will be able to:				
A. Knowledge and Understanding:		I, P or M/A		
a1	Describe the physical principles of radiographic imaging	I	A1	Demonstrate and understanding of fundamental knowledge of Biomedical sciences (Biology, Biophysics, Anatomy, Physiology, Sectional anatomy and medical imaging technique).
a2	Explain the operation and maintenance of radiographic equipment	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.
B. Intellectual Skills:				
b1	Analyze radiographic images to identify quality and diagnostic value	I	B3	Analyze and evaluate evidence-based information needed in medical imaging practice.
b2	Critically evaluate imaging techniques for various clinical scenarios	I	B1	Assess 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	Perform radiographic procedures with precision	I	C2	Apply technical skills in using medical imaging devices, tools, and materials in radiological technology practice.
c2	Implement quality control measures in radiographic imaging	I	C1	Execute quality management system and standard procedures in radiological technology practice.
D. Transferable Skills:				

d1	Communicate effectively with healthcare professionals	I	D1	Communicate effectively with clinicians, patients, and support staff.
d2	Demonstrate problem-solving skills in clinical settings	I	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	Describe the physical principles of radiographic imaging	▪ Lectures, Reading assignments	▪ Written exams, Quizzes
a2	Explain the operation and maintenance of radiographic equipment	▪ Lectures, Demonstrations	▪ Written exams, Quizzes

(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 radiographic images to identify quality and diagnostic value	▪ Image review sessions, Lectures, Demonstrations	▪ Written exams, Quizzes, Image analysis assignments, Oral exams
b2	Critically evaluate imaging techniques for various clinical scenarios	▪ Lectures, Demonstrations, Group discussions, Problem-based learning	▪ Written exams, Quizzes, Image analysis assignments, Oral exams

(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	Perform radiographic procedures with precision	▪ Lectures, Demonstrations,	▪ Written exams, Quizzes, Image

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c2	Implement quality control measures in radiographic imaging	Group discussions, Problem-based learning	analysis assignments, Oral exams
(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 effectively with healthcare professionals	▪ Group projects, Role-plays	▪ Presentations
d2	Demonstrate problem-solving skills in clinical settings		

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Introduction to Radiographic Imaging	- History of Radiography, Basic Concepts - Evaluating Standard and Specialized Techniques - Fundamental Concepts, X-ray Production	1	2	a1, a2
2	X-ray Production	X-ray Tube Design, Production Mechanisms	1	2	a1, a2
3	Radiation Interactions	Types of Radiation, Interactions with Matter	1	2	a1, b1
4	Image Formation	Image Formation Processes, Factors Affecting Image Quality	1	2	a1, b1
5	Radiographic Equipment	Design and Function, Maintenance Procedures	1	2	a2, c2
6	Image Quality Control	Quality Assurance Programs, Testing Procedures	1	2	b1, c2
7	Radiographic Techniques	Standard Procedures, Specialized Techniques	1	2	c1, c2
8	Mid-Term Exam	In all previous Topics	1	2	a1, a2, b1, b2, c1

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
9	Digital Imaging	– Digital Radiography, PACS, Image Processing	1	2	a1, b2
10	Radiation Safety	– Principles of Radiation Protection, Safety Standards	1	2	a2, c1
11	Contrast Media	– Types, Uses, Adverse Reactions	1	2	a1, b2
12	Advanced Imaging Modalities	– CT, MRI, Ultrasound, Nuclear Medicine	1	2	a1, b2
13	Radiographic Pathology	– Common Pathologies, Radiographic Appearance	1	2	b1, b2
14	Patient Care in Radiography	– Patient Positioning, Communication Skills	1	2	c1, d1
15	Current Trends in Radiography	– Emerging Technologies, Future Directions	1	2	a2, b2, d2
16	Final Theoretical Exam	– All theoretical topics	1	2	a1, a2, b1, b2, c1, c2
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				
3				
Number of Weeks /and Units Per Semester		14	28	

C. Tutorial Aspect (if any):

No.	Tutorial	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	None			

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Dalaq

No.	Tutorial	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
2				
3				
Number of Weeks /and Units Per Semester				

VII. Teaching Strategies:

- Lectures,
- Group Discussions,
- Group Projects,
- Collaborative Assignments
- Role-plays
- Demonstrations
- Problem-based learning

VII. Assessment Methods:

- Written exams
- Quizzes
- Image analysis assignments
- Oral exams
- Presentations

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs (symbols)
1	Radiation Safety Protocols Report	9	3	a2, c1
2	MRI Technique Report	11	3	c1, a1
3	Future Trends Presentation	14	4	a2, b2, d2
Total			10	

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

Prepared by:

Reviewed by:

Dr. -----

Head of the Department:

Dr. Awadh Al-Kubati

Quality Unit:

Dr. Mohammed
Al-shamahi

Dean:

Dr. Abdulsalam
Dalaq

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Midterm Written Exam	8	20	20%	a1, a2, b1, b2
3	Assignments	During semester	10	10%	a1, a2, b2, c2, d2
4	Final Written Exam	16	70	70%	a1, a2, b1, b2
Total			100	100 %	

IX. Learning Resources:

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

- 1- Bushong, S. C. (2020). *Radiologic Science for Technologists: Physics, Biology, and Protection* (12th ed.). Elsevier.
- 2- Ballinger, P. W., & Frank, E. D. (2003). *Merrill's Atlas of Radiographic Positioning and Procedures* (10th ed.). Mosby.

2- Essential References:

- 1- Carlton, R. R., & Adler, A. M. (2019). *Principles of Radiographic Imaging: An Art and a Science* (6th ed.). Cengage Learning.
- 2- Bontrager, K. L., & Lampignano, J. P. (2013). *Textbook of Radiographic Positioning and Related Anatomy* (9th ed.). Mosby.

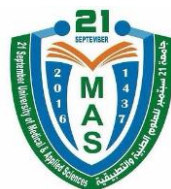
3- Electronic Materials and Web Sites etc.:

Electronic Materials and Websites

- Access to radiologic imaging databases (e.g., Radiopaedia.org)
- Online journal subscriptions (e.g., Radiology, Journal of Radiology)
- [RadiologyInfo](#)
- [RSNA](#)

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 Radiographic Imaging Principles 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

I. General Information:

12.	Course Title:	Radiographic Imaging Principles			
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:	2 nd Level / 1 st 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:

This course provides an in-depth understanding of the principles and techniques of radiographic imaging. Topics include the physics of radiographic imaging, equipment operation, image production, quality control, and radiation safety. The course emphasizes practical skills and clinical applications, preparing students for advanced diagnostic imaging techniques.

III. Course Intended Learning Outcomes (CILOs) :

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

A. Knowledge and Understanding:

- | | |
|----|---|
| a1 | Describe the physical principles of radiographic imaging |
| a2 | Explain the operation and maintenance of radiographic equipment |

B. Intellectual Skills:

- | | |
|----|---|
| b1 | Analyze radiographic images to identify quality and diagnostic value |
| b2 | Critically evaluate imaging techniques for various clinical scenarios |

C. Professional and Practical skills:

- | | |
|----|--|
| c1 | Perform radiographic procedures with precision |
| c2 | Implement quality control measures in radiographic imaging |

D. Transferable Skills:

- | | |
|----|---|
| d1 | Communicate effectively with healthcare professionals |
| d2 | Demonstrate problem-solving skills in clinical settings |

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	Introduction to Radiographic Imaging	- History of Radiography, Basic Concepts - Evaluating Standard and Specialized Techniques - Fundamental Concepts, X-ray Production	1	2
2	X-ray Production	X-ray Tube Design, Production Mechanisms	1	2
3	Radiation Interactions	Types of Radiation, Interactions with Matter	1	2
4	Image Formation	Image Formation Processes, Factors Affecting Image Quality	1	2
5	Radiographic Equipment	Design and Function, Maintenance Procedures	1	2

Prepared by:

Reviewed by:

Dr. -----

Head of the Department:

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Quality Unit:

Dr. Mohammed
Al-shamahi

Dean:

Dr. Abdulsalam
Dalaq

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
6	Image Quality Control	– Quality Assurance Programs, Testing Procedures	1	2
7	Radiographic Techniques	– Standard Procedures, Specialized Techniques	1	2
8	Mid-Term Exam	– In all previous Topics	1	2
9	Digital Imaging	– Digital Radiography, PACS, Image Processing	1	2
10	Radiation Safety	– Principles of Radiation Protection, Safety Standards	1	2
11	Contrast Media	– Types, Uses, Adverse Reactions	1	2
12	Advanced Imaging Modalities	– CT, MRI, Ultrasound, Nuclear Medicine	1	2
13	Radiographic Pathology	– Common Pathologies, Radiographic Appearance	1	2
14	Patient Care in Radiography	– Patient Positioning, Communication Skills	1	2
15	Current Trends in Radiography	– Emerging Technologies, Future Directions	1	2
16	Final Theoretical Exam	– All theoretical 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			
3			
Number of Weeks /and Units Per Semester		14	28

C. Tutorial Aspect (if any):

No.	Tutorial	Number of Weeks	Contact Hours
1	None		

Prepared by:

Reviewed by:

Dr. -----

Head of the Department:

Dr. Awadh Al-Kubati

Quality Unit:

Dr. Mohammed
Al-shamahi

Dean:

Dr. Abdulsalam
Dalaq

No.	Tutorial	Number of Weeks	Contact Hours
2			
3			
Number of Weeks /and Units Per Semester			

VII. Teaching Strategies:

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- Group Discussions,
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No.	Assignments	Week Due	Mark
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3	Future Trends Presentation	14	4
Total			10

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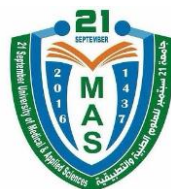
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Electronic Materials and Websites

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