Course Specification
(Bachelor)

Course Title:	Medical Physics
Course Code:	PHYS 0407
Program:	BSc Physics
Department:	Physics
College:	Science
Institution:	Majmaah University
Version:	*Course Specification Version Number*
Last Revision Date:	30 December 2024

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours: (3,0,0)					
2. Course type					
A.	☐University	☐College	☒ Department	☐Track	☐Others
B.	☐Required		☒ Elective		
3. Level/year at which this course is offered: (……)					
4. Course General Description:					
Medical Physics is a specialized field that applies the principles of physics to medicine. This course provides a comprehensive overview of the physical principles underlying various medical imaging and therapeutic techniques.					
5. Pre-requirements for this course (if any)**:**					
PHYS 0351					
6. Co-requisites for this course (if any)**:**					
NA					
7. Course Main Objective(s):					
Understand the fundamental principles of physics relevant to medical applications **Apply physical principles to analyze and interpret medical images.** **Develop skills in radiation dosimetry and radiation protection.**					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	E-learning		
3	Hybrid		

No	Mode of Instruction	Contact Hours	Percentage
	• Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	45
2.	**Laboratory/Studio**	
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		100%

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	**Knowledge and understanding**			
1.1	Recognize electromagnetic Spectrum and Radiation, Basic Interactions of ionizing and non-Ionizing Radiation with biological matter		**Lectures** **Solved Problems** **Videos** **Group discussion**	**Homework** **Assignments** **Quizzes** **Exams**
2.0	**Skills**			
2.1	skills to develop critical thinking and problem-solving skills in the context of medical physics.		**Lectures** **Solved Problems** **Videos**	Assignments Quizzes Exams Presentations

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
2.3	Explain the physical laws and principles to understand the subject		**Group discussion**	
3.0	Values, autonomy, and responsibility			
3.1	An understanding of professional and ethical responsibility.		**Lectures** **Solved Problems** **Videos** **Group discussion**	Assignments Quizzes Exams Presentations

C. Course Content

No	List of Topics	Contact Hours
1.	**Introduction to Medical Physics** What is medical physics? The importance of medical physics The applications of medical physics	6
2.	**Electromagnetic Spectrum and Radiation:** Electric and magnetic field, electromagnetic radiation, types of E-M radiation, properties of E-M radiation, Spectrum of visible light , Charged particle, neutron particle,	9
3	**Radiation Physics:** Interaction of radiation with matter Radiation dosimetry and radiation protection Radiobiology and radiation therapy	9
4	**Medical Imaging**: X-ray imaging Computed tomography (CT) Magnetic resonance imaging (MRI) Nuclear medicine (PET and SPECT)	12
5	**Radiation Therapy:** Introduction to Radiotherapy Physics Linear Accelerators Radiotherapy treatment planning Brachytherapy	9
Total		**45**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quiz	4-5	10
2.	Mid-Term Exam 1	6-8	15
3.	Homework	continuous	10
...	Presentation and discussion	9-10	10
	Mid-Term Exam 2	9-11	15
	Final Exam	end	40

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.).

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Radiation Physics for Medical Physicists, Ervin B. Podgorsak (auth.) Springer International Publishing 2016
Supportive References	Medical Imaging Physics ,W.R. Hendee and E.R. RitenourWiley-Liss 2003
Electronic Materials	https://www.medphys.org/
Other Learning Materials	Physics of Radiology A.B. Wolbarst Medical Physics Publishing year :2004

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (projector, smart board, software)	data show, Smart Board, Internet
Other equipment (depending on the nature of the specialty)	Medical equipment

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Internal Reviewer committee	Direct

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of Students' assessment	Students	Indirect
Quality of learning resources	Peer review	Direct, Indirect
The extent to which CLOs have been achieved	Peer review	Indirect
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**PHYSICS DEPARTMENT COUNCIL**
REFERENCE NO.	**16**
DATE	**30/12/2024**