هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

Course Title:	Medical Physics
Course Code:	PHYS 462
Program:	B.Sc. in Physics
Department:	Department of Physics and astronomy
College:	College of Science
Institution:	King Saud University
Version:	2.0.0
Last Revision Date:	October 2023

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	2(2+0+0)				
2. Course type					
a.	University ☐	College ☐	Department☒	Track☐	Others☐
b.	Required ☐	Elective☒			
3. Level/year at which this course is offered:	8th level / fourth year.				
4. Course general Description The course aims to introduce students to medical imaging and therapy, Radiation Imaging by ionizing radiation such as X-Ray, Nuclear Medicine and non-ionizing radiation like Ultrasound Imaging and Magnetic Resonance Imaging (MRI). Radiation Therapy. Planning, linear accelerator and radiation therapy, treatment by sealed and unsealed sources. Radiation Protection in Medical Physics					
5. Pre-requirements for this course (if any): Math 101					
6. Co- requirements for this course (if any): Phys 111					
7. Course Main Objective(s) 1. Simple vectors analysis and unit measurements and their conversions. 2. Description of motion in one dimension. 3. The study of Newton's law and force concept. 4. The meaning of energy in physics: its concept and main types, energy conversion, and work–kinetic energy theorem 5. Introduction to fluid mechanics: its dynamic and applications. 6. The concept of temperature and energy transfer mechanisms in Thermal Processes.					

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	30	100%
2.	E-learning	0	0
3.	Hybrid • Traditional classroom • E-learning	0	0
4.	Distance learning	0	0

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	30
3.	Field	0
4.	Tutorial	0
5.	Others (specify)	0
	Total	30

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

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	• Able to distinguish between the interaction of radiation with matter	K1	• Give extensive examples during lecture. • Give problem sheets to be discussed during lecture..	• Hold Class discussion, tutorial sessions. • Give quizzes, mid-term exam and final exam.
1.2	• Describe the ionizing and non-ionizing radiation based imaging system and relate them to their applications.	K2		
1.3	• Distinguish between different radiation therapy systems.	K3	• In-class, use some interactive animation.	In class, and short MCQs quizzes. Major and final exams.
1.4	• Understand the basics of radiation protection in medical physics	K4	• Homework assignments	In class, and short MCQs quizzes. Major and final exams.
2.0	Skills			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
2.1	• Identify physical phenomenon of different radiation types.	S1	• Give extensive examples during lecture • Give problem sheets to be discussed during lecture and labs. • assignments. • Discussions in the classes	• Hold Class discussion, tutorial and lab sessions. • Give quizzes, mid-term exam and final exam.
2.2	• How to simplify and solve problems cover radiation interaction with matter .	S2		
2.3	How technology is build from simple phenomena and physical laws and so modified to advanced present states.	S3		
3.0	Values, autonomy, and responsibility			
3.1	Write scientific reports on stat of art imaging devices and their reconstruction algorithm.	V1	• assignments. • Homework	Hold Class discussion

C. Course Content

No	List of Topics	Contact Hours
1.	**Radiation interaction with matter**	2
2.	**Introduction to medical physics branches**	2
3.	X-ray production and imaging	4
4.	**Introduction to Nuclear Medicine**	2
5.	**PET and Gamma cameras**	4
6.	**Non-ionizing radiation based imaging**	2
7	**Ultrasound imaging techniques and applications**	4
8.	**Basic principle of MRI imaging**	2
9.	**linear accelerator and radiation therapy**	2
10.	**treatment by sealed and unsealed sources**	2
11.	**Radiation Protection in Medical Physics**	4
Total		30

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	First Midterm examination	Approx. 6	20%
2.	Second Midterm examination	Approx. 12	20%
3.	HW and presentation	Weekly	20%
4.	Final examination	From 16 to 18	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, Podgorsak.(Springer2006) Radiation Protection in Medical Physics, Yves Lemoiane (Springer2011)
Supportive References	None
Electronic Materials	None
Other Learning Materials	Internet sites relevant to the course

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	A classroom which accommodates 25 students.
Technology equipment (projector, smart board, software)	Whiteboard and Smart board
Other equipment (depending on the nature of the specialty)	Not applicable

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students\ Peer Reviewer	Indirect \ direct
Effectiveness of students assessment	Students- Faculty	Direct
Quality of learning resources	students	Indirect
The extent to which CLOs have been achieved	Faculty	Indirect
Other	None	None

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	Physics Department's council
REFERENCE NO.	10th (2nd term 1445)
DATE	12\07\1445