2023
TP-153

Course Specification
(Bachelor)

Course Title:	**Radiobiology**
Course Code:	**MPHY6353**
Program:	**Medical Physics**
Department:	**Physics**
College:	**Science**
Institution:	**University of Bisha**
Version:	**1**
Last Revision Date:	5 September 2023

Table of Contents

A. General information about the course:

Course Identification					
1. Credit hours:	2				
2. Course type					
a.	University ☐	College ☐	Department☒	Track☐	Others☐
b.	Required ☐	Elective☐			
3. Level/year at which this course is offered:	6^{th} Level / 3^{rd} year				
4. Course general Description This course covers the biological effects of radiation, including mechanisms of DNA damage, and normal tissue injury. Radiation biology data, radiation action at the cellular and tissue level; radiation effects on human populations, carcinogenesis, genetic effects; radiation protection; tumor control, normal-tissue complication probabilities.					
5. Pre-requirements for this course (if any): NA					
6. Co- requirements for this course (if any): NA					
7. Course Main Objective(s) Recognize the biological effects of radiation, radiation action at the cellular and tissue level, the genetic effects. Recognize how the radiation protection.					

1. Teaching mode (mark all that apply)

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

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30

2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
	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	explain Ionizing Radiation Production and Interactions of Ionizing Radiation.	K1	Lecturing	Quizzes Homework Midterm exam Final exam
1.2	Describe the Effects Biological of Ionizing Radiation, on DNA molecules and on normal tissues.	K2		
1.3	explain the Absorbed dose and distribution from beams of radiation.	K2		
2.0	Skills			
2.1	Analyze the chemical relationship for the Effects distribution beams of radiation.	S1	Solve problems. Self-learning	Quizzes Homework Midterm exam Final exam
2.2	Communicate positively with others.	S4	Presentation Work group	Reports Presentation
3.0	Values, autonomy, and responsibility			
3.1	Exhibit self-learning skills independently.	V2	Self-learning	Reports Presentation
3.2	Ability to work in team effectively.	V3	Work group	Reports Presentation

C. Course Content

No	List of Topics	Contact Hours
1.	**Production Ionizing Radiation** Nuclear Decay Processes. Types and sources of ionizing radiation. Description of ionizing radiation fields.	3
2.	X-ray Production. Other Sources of Radiation.	3
3.	**Interactions of Ionizing Radiation** Attenuation and Cross Section. X-rays and Gamma Radiation.	3
4.	Particles. Detection of Ionizing Radiation.	3
5.	**Biological Effects of Ionizing Radiation** Mechanisms of Cell Damage. Dose and Dose Equivalent.	3
6.	Types of Effect. Medical Effects and Risk. Ultraviolet Radiation.	3
7.	**Effects of irradiation Dosimetry-micro dosimetry** Absorbed dose. Dose distribution from beams of radiation. Distribution of dose on a microscopic scale.	3
8.	**Effects of radiation on DNA molecules and chromosomes** DNA molecules and their relationship with chromosomes. Repair of DNA lesions.	3
9.	Effects of radiation on chromosomes. DNA lesions and cell death.	3
10.	**Effects on normal tissues** From cellular effects to tissue damage. Late effects. Examples furnished by certain tissues.	3
Total		30

Table: The matrix of consistency between the content and the learning outcomes of the course.

	Course Learning Outcomes						
	1.1	1.2	1.3	2.1	2.2	3.1	3.2
Topic 1	√				√	√	√
Topic 2	√				√	√	√
Topic 3	√				√	√	√

Topic 4	√				√	√	√
Topic 5		√		√	√	√	√
Topic 6		√		√	√	√	√
Topic 7			√	√	√	√	√
Topic 8		√		√	√	√	√
Topic 9		√		√	√	√	√
Topic 10							

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework, quizzes, reports, and presentation.	1: 15	10 %
2.	First term exam	7: 8	20 %
3.	Second term exam	12:13	20 %
4.	Final exam	End of Semester	50 %

*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	Introduction to Radiobiology, 10th Edition, by M. Tubiana, J. Dutreix, Taylor & Francis, London. New York. 1990.
Supportive References	Introduction to Biological Physics for the Health and Life Sciences, 2nd Edition, by Kirsten Franklin et. All, Willey, 2019.
Electronic Materials	- Blackboard. - PowerPoint presentations. - Digital library of University of Bisha https://ub.deepknowledge.io/Bisha
Other Learning Materials	NA

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms

Items	Resources
Technology equipment (projector, smart board, software)	Projector or smart board
Other equipment (depending on the nature of the specialty)	NA

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students.	Indirect (Questionnaire).
Effectiveness of student's assessment	Students, Staff members, Program Leader.	Indirect (Questionnaire).
	Peer Reviewer.	Direct (Review exam)
Quality of learning resources	Students, Staff members, Program Leaders.	Indirect (Questionnaire).
The extent to which CLOs have been achieved	Students, Staff members, Program Leader.	Indirect (Questionnaire).
	Course coordinator.	Direct (Course Learning Outcomes Assessment).

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

G. Specification Approval Data

COUNCIL /COMMITTEE	College of Science Council
REFERENCE NO.	١
DATE	5 September 2023