هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

Course Specifications

Course Title:	**Radiation Physics**
Course Code:	**2034202-4**
Program:	**Bachelor in Physics**
Department:	**Physics Department**
College:	**College of Science**
Institution:	**Taif University**

Table of Contents

A. Course Identification

1. Credit hours:4
2. Course type **a.** University ☐ College ☐ Department ☑ Others ☐ **b.** Required ☑ Elective ☐
3. Level/year at which this course is offered: 11th level / 4th year
4. Pre-requisites for this course (if any)**: Nuclear Physics 2034103-4**
5. Co-requisites for this course (if any)**: NONE**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	**7**	**100 %**
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	50
2	**Laboratory/Studio**	20
3	**Tutorial**	0
4	**Others** (specify)	0
	Total	**70**

B. Course Objectives and Learning Outcomes

1. Course Description

This course covers radioactivity (natural and manmade), nuclear radiation decay, interaction of radiation with matter, radiation detectors , radiation protection , effect of radiation on human, monitoring of radiation , radiation doses.

2. Course Main Objective

- ✓ Recognizing the natural radioactivity and cosmic rays and laws of decay.
- ✓ Inspect the various methods of interaction of radiation of radiation with matter.
- ✓ Recognizing the types and structure of various radiation detectors.
- ✓ Recognizing the concepts of ionizing radiation
- ✓ Identify the effect of nuclear radiation on man
- ✓ Inspect various dosimeters and their use in radiation physics
- ✓ Inspect various means of protection from ionizing radiation
- ✓ Inspect Methods of calculation of radiation doses and the regulations of ICRP

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge and Understanding:**	
1.1	List the types of radiation, natural and artificial.	K4
1.2	Recognize types of radiation detectors and dosimeters.	K3
1.3	Understanding the mechanisms describing radioactive decay and the production of ionizing radiation.	K3
2	**Skills:**	
2.1	Compare between the types of radiation.	S1
2.2	Calculating the half-life for radioactive sources and the activity of radioisotopes used in Medical applications	S2
3	**Values:**	
3.1	Work efficiently within a teamwork frame to perform class and laboratory activities.	V2
3.2	Act responsibly and be able to prepare a written scientific report.	V3

C. Course Content

No	List of Topics	Contact Hours
1	Ionizing radiation: α, β, γ, P, n, and fission fragments.	7
2	Radioactivity (natural and artificial), laws of radioactivity.	4
3	Interaction of radiation with matter.	7
4	Radiation detectors and dosimeters.	7
5	Radiation protection.	6
6	Radiation doses and calculation of them	6
7	Precaution of radiation	6
8	Radiation effect on human beings	7
Total		**50**
Part-2(Laboratory)		
1	Scintillation detectors	2
2	Background measurements	2
3	Energy calibration	2
4	Spectrum of Gamma rays	2
5	Determine the energy of an unknown gamma-ray source	2
6	Compton scattering	2
7	Pair production and annihilation	2
8	Energy resolution	2
9	Half-life of ^{137}Ba	2
10	Reports evaluation and practical exam	2
Total		**70**

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge and Understanding:**		
1.1	List the types of radiation, natural and artificial.	Lectures Discussions	-Assignments -Written exams
1.2	Recognize types of radiation detectors and dosimeters.	Lectures Discussions	-Assignments -Written exams
1.3	Understanding the mechanisms describing radioactive decay and the production of ionizing radiation.	Lectures Discussions	-Assignments -Written exams
2.0	**Skills:**		
2.1	Compare between the types of radiation.	Lectures Discussions	-Assignments -Written exams
2.2	Calculating the half-life for radioactive sources and the activity of radioisotopes used in Medical applications	Lectures Discussions	-Assignments -Written exams
3.0	**Values:**		
3.1	Work efficiently within a teamwork frame to perform class and laboratory activities in solid state physics.	Lab work Essays	- Lab reports - Lab exam - Essay evaluation
3.2	Act responsibly and be able to prepare a written scientific report.	Lab work Discussions	- Lab reports - Lab exam - Essay evaluation

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm exam I	6^{th}	20 %
2	Activities	Periodically	10 %
3	Lab reports	Weekly/ 10^{th}	20 %
4	Final Lab Exam	10^{th}	10 %
5	Final exam	11^{th}	40 %

***Assessment task** (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice:

- Each faculty member is assigned a group of students for continuous academic advice during six office hours weekly (6 hrs./week).

- Teaching staff are available for individual student consultations during office hours.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	1- Introductory radiation Physics, S. Krane, Wiley, 3rd edition, 1987.
Essential References Materials	2- Radiation protection, 4 th edition, by: Jacob Shapiro, Harvard university press, Cambridge, England 2002 3- α, β & γ- ray Spectroscopy. Ed. by K. Siegbahn (North Holland Pub.co., Amsterdam, 1965) Vol.1.
Electronic Materials	
Other Learning Materials	• Lecture notes and PowerPoint presentations

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	• Lecture room with max 60 seats Labs
Technology Resources (AV, data show, Smart Board, software, etc.)	• Data show, • Smart Board, • Laptop
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	NON

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Student Feedback on Effectiveness of Teaching	Students	Indirect
Evaluation of Teaching	Pear reviewer Program coordinator Departmental council Faculty council	Indirect
Improvement of Teaching	Program coordinator Relevant committee	Direct
Quality of learning resources	Students Instructor Faculty	Indirect
Extent of achievement of course learning outcomes,	Program coordinator Instructor	Direct
Course effectiveness and planning for improvement	Program coordinator Instructor	Indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	October 2, 2022