هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

Course Title:	Nuclear Physics Lab
Course Code:	PHYS 492
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:	Sep 2023

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	**2(0+0+4)**				
2. Course type					
a.	University ☐	College ☐	Department☒	Track☐	Others☐
b.	Required ☒	Elective☐			
3. Level/year at which this course is offered:			8th level		
4. Course general Description The course aims to introduce students to the characteristics of Geiger Counter, Absorption of nuclear radiation, counting statistics, Determination of half-life time for radioactive elementو Detection of Gamma ray Spectroscopy using NaI (Tl) and SCA, Detection of Gamma ray Spectroscopy using NaI (Tl) and MCA, , Study of β-Ray Spectrum using Magnetic Spectrometer, Study of β-Ray Spectrum using MCA, Study of alpha particle Spectra.					
5. Pre-requirements for this course (if any): Nuclear Physics (PHYS 481)					
6. Co- requirements for this course (if any):					
7. Course Main Objective(s) 1. The student will gain awareness and knowledge of the nuclear physics models using nuclear electronics and equipment associated with each experiment. 2. The students gain technical skills of the calculation and measurements of the nuclear 3. properties 4. The student will be trained in the technical methods and the equipment used in nuclear physics research.					

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	44	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	0
2.	Laboratory/Studio	44
3.	Field	0
4.	Tutorial	0
5.	Others (specify)	0
	Total	44

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	Demonstrate knowledge of the radiation types and their characteristics, detector types (scintillation detectors, surface barrier detectors, and a gaseous ionization detectors).	K1	• Discussion with the students the theory of each experiment before the experiment starts and during the experiment. • Home assignment, self-study and report preparation.	• Pre-lab assignments , final exam.
1.2	Recognize and identify several laboratory instruments.	K2		
2.0	Skills			
2.1	Implement statistical calculations to correct and identify abnormal readings	S1	• Preform experiments. • Interaction with the students and encouragement for discussion. • Encourage the student to do their individual and team home work	• Hold Class discussion, tutorial, and lab sessions. • Final Exam
2.2	Analyze and execute critically the results of experiments investigation and draw valid conclusions.	S2		
2.3	Develop capability in using a variety of laboratory instruments to acquire, analyze, and interpret the data.	S3		
3.0	Values, autonomy, and responsibility			

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.1	Present a written report using appropriate scientific methods, think critically and work independently.	V1	• Ask students to make search on the internet on some related interesting topics, writing reports on the computer	• Hold Class discussion. • Assignments
3.2	Work as a team and appreciate the work of others.	V2	• Advise the students to: help each other in education, communicate with the lecturer to discuss difficulties.	• Learning the methods of scientific discussions through the questions related to each experiment.
3.3	Use different computer programs to analyze and plot the data.	V3	• Asking for solving some problems and plot some data.	• Assignments • Homework

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction	4
2.	Characteristics of Geiger Counter	4
3.	Counting statistics	4
4.	Absorption coefficient of Gamma rays	4
5.	Absorption coefficient of Beta rays	4
6.	Detection of Gamma ray Spectroscopy using NaI (Tl) and MCA	4
7.	Study of Beta Ray Spectrum using Magnetic Spectrometer	4
8.	Study of alpha particle Spectra	4
9.	Alpha Range Measurement	4
10.	Revision	8
Total		44

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Laboratory activates including (written lab reports, pre-lab assignments)	Weekly	60%

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
2.	Final examination	13th	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	1-Notes on Nuclear experiments written in Arabic, byDr. M. S. Garawi 2-Radiation detection and Measurements, by: Glenn F. Knoll 3- Principles of Radioisotope Methodology , by: Grafton D. Chase and Joseph L. 4 -أسس الفيزياء الإشعاعية , تأليف : أ.د. محمد فاروق أحمد و د. أحمد محمد السريع، مطابع جامعة الملك سعود – الرياض 1429
Supportive References	
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	A laboratory.
Technology equipment (projector, smart board, software)	Equipment and computer attached to each experiment with (CASSY Lab - Minitab) software.
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.	6th (1st term/1446)
DATE	22/05/1446