هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

2023
TP-153

Course Specification

(Bachelor)

Course Title:	**Modern Physics**
Course Code:	**PHYS26361**
Program:	**Physics**
Department:	**Physics**
College:	**Science**
Institution:	**University of Bisha**
Version:	**3**
Last Revision Date:	25 July 2023

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours:	3

2. Course type					
A.	University ☐	College ☐	Department☒	Track☐	Others☐
B.	Required ☒	Elective☐			
3. Level/year at which this course is offered:					5th Level / 3rd year
4. Course general Description					
The course of modern physics is devoted to the main results in physics, which were achieved in the 20-th century. This course introduces the special theory of relativity, the basic concepts of quantum mechanics and atomic physics.					
5. Pre-requirements for this course:					
NA					
6. Co- requirements for this course:					
NA					
7. Course Main Objective(s)					
Recognize the relativity, the basic concepts quantum mechanics and atomic physics.					

2. Teaching mode (mark all that apply)

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

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	Define the principles of relativity.	K.2	Lectures Solve problems	Written test Reports Homework Quizzes
1.2	Recognize the principles of quantum physics.	K.2		
1.3	Define the fundamentals properties of atom.	K.2		
2.0	Skills			
2.1	Solve problem related to the relativity.	S.1	Lectures Solve problems.	Written test Reports Homework Quizzes
2.2	Apply the principles of quantum physics.	S.1		
2.3	Solve problem related to atom.	S.1		
3.0	Values, autonomy, and responsibility			
3.1	Exhibit self-learning skills independently.	V.2	Self-learning	Reports Presentation

C. Course Content

No	List of Topics	Contact Hours
1.	**Relativity** 1. The principle of Galilean relativity. 2. The Michelson–Morley experiment. 3. Einstein's principle of relativity.	4.5
2.	**Relativity** 4. Consequences of the special theory of relativity. 5. The Lorentz transformation equations.	4.5
3.	**Relativity** 7. Relativistic linear momentum. 6. The Lorentz velocity transformation equations.	4.5
4.	**Relativity** 8. Relativistic energy.	4.5

	9. The general theory of relativity.	
5.	**Introduction to Quantum Physics** 1. Blackbody radiation and Planck's hypothesis. 2. The photoelectric effect.	4.5
6.	**Introduction to Quantum Physics** 3. The Compton effect. 4. The nature of electromagnetic waves. 5. The wave properties of particles.	4.5
7.	**Introduction to Quantum Physics** 6. A new model: the quantum particle. 7. The double-slit experiment revisited. 8. The uncertainty principle.	4.5
8.	**Atomic Physics** 1. Atomic spectra of gases. 2. Early models of the atom.	4.5
9.	**Atomic Physics** 3. Bohr's model of the hydrogen atom.	4.5
10.	**Atomic Physics** 4. Physical interpretation of the quantum numbers.	4.5
Total		45

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

	Course Learning Outcomes						
	1.1	1.2	1.3	1.1	1.2	1.3	3.1
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 %

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
4.	Final exam	End of Semester	50 %

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	- Physics for Scientists and Engineers, 10th Edition, by Raymond A. Serway, John W. Jewett, BROOKS/COLE CENGAGE Learning, Boston USA, ASIN: B00E6TSR92, (2019).
Supportive References	- Fundamentals of Physics Extended, 12th Edition, David Halliday, Robert Resnick, Jearl Walker, Wiley, 2021. - Concepts of Modern Physics, 6th edition, Arthur beiser, McGraw USA, (2003).
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, Physics lab.
Technology equipment	Data show or smart board.
Other equipment	NA

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Extent of achievement of course learning outcomes.	Teachers, students.	Direct (Final exams), Indirect (Questionnaire).
Effectiveness of teaching.	Teachers, students.	Indirect (Questionnaire)
Effectiveness of assessment.	Teachers, students.	Indirect (Questionnaire)
Quality of learning resources	Teachers, students.	Indirect (Questionnaire)
Quality of facilities available	Teachers, students.	Indirect (Questionnaire)
Fairness of evaluation	Peer reviewer.	Direct (Final exams reevaluation).

G. Specification Approval Data

COUNCIL /COMMITTEE	College of Science Council
REFERENCE NO.	20
DATE	17 August 2023