



# Course Specification

— (Bachelor)

Course Title:	<b>Modern Physics</b>
Course Code:	<b>MPHY26341</b>
Program:	<b>Medical Physics</b>
Department:	<b>Physics</b>
College:	<b>Science</b>
Institution:	<b>University of Bisha</b>
Version:	<b>1</b>
Last Revision Date:	5 September 2023

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## A. General information about the course:

### 1. Course Identification

<b>1. Credit hours:</b>	3 (2 Lectures + 1 Laboratory)				
<b>2. Course type</b>					
A.	University <input type="checkbox"/>	College <input type="checkbox"/>	Department <input checked="" type="checkbox"/>	Track <input type="checkbox"/>	Others <input type="checkbox"/>
B.	Required <input checked="" type="checkbox"/>		Elective <input type="checkbox"/>		
<b>3. Level/year at which this course is offered:</b>	5 <sup>th</sup> Level / 3 <sup>rd</sup> year				
<b>4. Course general Description</b>					
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.					
<b>5. Pre-requirements for this course (if any):</b>					
NA					
<b>6. Co- requirements for this course (if any):</b>					
NA					
<b>7. Course Main Objective(s)</b>					
Recognize the relativity, the basic concepts quantum mechanics and atomic physics.					

### 1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	4	100%
2.	E-learning		
3.	Hybrid <ul style="list-style-type: none"> <li>• Traditional classroom</li> <li>• E-learning</li> </ul>		
4.	Distance learning		

### 2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	30
2.	Laboratory/Studio	30
3.	Field	
4.	Tutorial	





5.	Others (specify)	
	Total	60

## 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 the principles of relativity.	K1	Lecturing	Quizzes Homework Midterm exam Final exam
1.2	Recognize the principles of quantum physics.	K1		
1.3	Describe the fundamentals properties of atom.	K1		
2.0	Skills			
2.1	Solve problems in modern physics.	S1	Solve problems	Quizzes Homework Midterm exam Final exam
2.2	analyze experimental data.	S2	Practices lab	Reports Practical exam
2.3	Communicate positively with others.	S4	Work group	Reports Presentation
3.0	Values, autonomy, and responsibility			
3.2	Ability to work in team effectively.	V3	Work group	Reports Presentation

## C. Course Content

No	List of Topics	Contact Hours
1.	<b>Relativity</b> 1. The principle of Galilean relativity. 2. The Michelson–Morley experiment. 3. Einstein’s principle of relativity. <b>Experiment #1.</b>	6
2.	4. Consequences of the special theory of relativity. 5. The Lorentz transformation equations. <b>Experiment #2.</b>	6
3.	6. Relativistic linear momentum. 7. The Lorentz velocity transformation equations.	6





	<b>Experiment #3.</b>	
4.	8. Relativistic energy. 9. The general theory of relativity. <b>Experiment #4.</b>	6
5.	<b>Introduction to Quantum Physics</b> 1. Blackbody radiation and Planck's hypothesis. 2. The photoelectric effect. <b>Experiment #5.</b>	6
6.	3. The Compton effect. 4. The nature of electromagnetic waves. 5. The wave properties of particles. <b>Experiment #6.</b>	6
7.	6. A new model: the quantum particle. 7. The double-slit experiment revisited. 8. The uncertainty principle. <b>Experiment #7.</b>	6
8.	<b>Atomic Physics</b> 1. Atomic spectra of gases. 2. Early models of the atom. <b>Experiment #8.</b>	6
9.	3. Bohr's model of the hydrogen atom. <b>Experiment #9.</b>	6
10.	4. Physical interpretation of the quantum numbers. <b>Experiment #10.</b>	6
<b>Total</b>		<b>60</b>

## D. Students Assessment Activities

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

## E. Learning Resources and Facilities

### 1. References and Learning Resources

#### Essential References

Physics for Scientists and Engineers, 10<sup>th</sup> Edition, by Raymond A. Serway, John W. Jewett, BROOKS/COLE CENGAGE Learning, 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 <a href="https://ub.deepknowledge.io/Bisha">https://ub.deepknowledge.io/Bisha</a>
Other Learning Materials	NA

## 2. Required Facilities and equipment

Items	Resources
facilities	<p><b>Laboratory equipment</b></p> <ol style="list-style-type: none"> <li>1. Experiment: Plank's Constant.</li> <li>2. Experiment: Determination of the work function of material by photoelectric effect.</li> <li>3. Experiment: Verification of the inverse Square law.</li> <li>4. Experiment: Determination of the wavelength of an unknown lamp.</li> <li>5. Experiment: Specific charge of the electron.</li> <li>6. Experiment: Balmer series of hydrogen.</li> <li>7. Experiment: Stefan-Boltzmann law.</li> <li>8. Experiment: Frank-Hertz Experiment.</li> <li>9. Experiment: Millikan Experiment.</li> </ol> <p>Or</p> <ol style="list-style-type: none"> <li>Experiment: Faraday effect experiment.</li> <li>10. Experiment: Electron diffraction.</li> </ol>
Technology equipment	Projector 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)





Assessment Areas/Issues	Assessor	Assessment Methods
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.	1
DATE	5 September 2023

