Course Specification
(Bachelor)

Course Title:	Physics 1 for Engineering
Course Code:	PHYS1110
Program:	Bachelor Engineering Programs
Department:	Department of Physics
College:	College of Science
Institution:	Umm Al-Qura University
Version:	47
Last Revision Date:	12/1/2025

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A. General information about the course:

1. Course Identification

1. Credit hours: (4)					
2. Course type					
A.	☐ University	☒ College	☐ Department	☐ Track	☐ Others
B.	☒ Required		☐ Elective		
3. Level/year at which this course is offered: (Level 1 / Year 1)					
4. Course General Description:					
The course covers some of the main principles of general physics, such as measurements, vectors, motion, Newton's laws, work and energy, thermodynamics and acoustics. Students focus on solving calculus-based physics problems.					
5. Pre-requirements for this course (if any)**:**					
6. Co-requisites for this course (if any)**:**					
MTH1181 Calculus (1) for Engineering					
7. Course Main Objective(s):					
The course is designed to provide students with some basic and essential concepts in general physics (mechanics, thermodynamics and acoustics), with a strong emphasis on solving calculus-based physics problems. The main subjects that this course covers are listed below. In addition to these items, the students should gain practical skills through conducting experiments in the laboratory.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	90	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**	45
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		90

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Define the concepts of the measurements, length, time, and weight.	KLO1, KLO3	Lectures and lab experiments	Exams, homework and quizzes
1.2	Differentiate between the vectors and the scalars	KLO1, KLO3		
1.3	Describe the behavior of sound waves	KLO1, KLO3		
2.0	**Skills**			
2.1	Apply Newton's laws of motion to calculate the position, velocity and acceleration in one and multiple dimensions.	KLO1, KLO3	Lectures and lab experiments	Exams, homework and quizzes
2.2	Relate force to potential and kinetic energies	KLO1, KLO3		
2.3	Explain the properties of heat.	KLO1, KLO3		
2.4	Conduct experiments and analyze data	KLO1, KLO3		

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
3.0	**Values, autonomy, and responsibility**			
3.1	Work effectively responsibly in teamwork	KLO7	Lectures and lab experiments	Exams, homework and quizzes
...				

C. Course Content

No	List of Topics	Contact Hours
1.	**Measurement** ● Measuring Things ● The International System of Units ● Changing Units ● Time ● Mass	3
2.	**Motion Along a one, two and three dimensions** ● Position and Displacement (in one, two and three dimensions) ● Average Velocity and Average Speed(in one, two and three dimensions) ● Instantaneous Velocity and Speed (in one, two and three dimensions) ● Acceleration (in one, two and three dimensions) ● Constant Acceleration ● Free-Fall Acceleration ● Projectile Motion	7
3.	**Vectors** ● Vectors and Scalars ● Adding Vectors Geometrically ● Components of Vectors ● Unit Vectors ● Adding Vectors by Components ● Multiplying Vectors	3
4.	**Force and Motion** ● Newton's First Law ● Force ● Mass ● Newton's Second Law ● Newton's Third Law	6

	• Applying Newton's Laws • Friction (static and dynamic coefficients)	
5.	**Kinetic Energy and Work** • Kinetic, potential and mechanical energy • Work • Work and Kinetic Energy • Power • Conservation of Energy	4
6.	**Center of Mass and Linear Momentum** • The Center of Mass • Linear Momentum • Conservation of Linear Momentum • Inelastic and Inelastic Collisions in One Dimension	4
7.	**Rotational motion** • Rotational Variables • Rotation with Constant Angular Acceleration • Relating the Linear and Angular Variables • Kinetic Energy of Rotation Torque • Work and Rotational Kinetic Energy • The Kinetic Energy of Rolling • Angular Momentum • Conservation of Angular Momentum	7
8.	**Equilibrium and Elasticity** • Equilibrium • The Requirements of Equilibrium • Some Examples of Static Equilibrium • Elasticity • Indeterminate Structures • Elasticity	3
9.	**Waves and Acoustics** • Variables of a wave: frequency, wavelength and period • Speed of Sound • Interference • Sound Sanding Waves in Pipes • The Doppler Effect	4
10.	**Heat and Thermodynamics** • Temperature • The Zeroth Law of Thermodynamics • The Celsius and Fahrenheit Scales • Thermal Expansion • Temperature and Heat • The Absorption of Heat	4

	• Heat and Work	
11.	**Practical Part:** • Students will conduct various experiments in the practical part of the course. Each student will perform the experiment, collect data, extract result, and prepare a written report every week.	45
Total		**90**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes and homework	All weeks	10%
2.	Midterm exam	9th week	20%
3.	Lab report	Every week	10%
4.	Lab final practical exam	17th week	10%
5.	Final exam	End of term	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	Halliday & Resnick, Jearl Walker, "Fundamentals of Physics" 10th Edition (2018)
Supportive References	
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	• Classrooms and labs
Technology equipment (projector, smart board, software)	• Blackboard • Projector
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students	Questionnaire (indirect)
Effectiveness of Students assessment	Instructors of the course	Peer review of exam marking (direct)
Quality of learning resources	Instructor	Course report (indirect)
The extent to which CLOs have been achieved	Instructor	Course report (indirect)
Other		

Assessors (Students, Faculty, Program Leaders, Peer Reviewers, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**ACADEMIC CURRICULUM AND PLANS COMMITTEE IN COLLEGE OF ENGINEERING AND ARCHITECTURE**
REFERENCE NO.	
DATE	**12/1/2025**

