COURSE SPECIFICATION

Course Title:	**General Physics**
Course Code:	**4031101-4**
Program:	**BSc Biology**
Department:	**Physics**
College:	**Applied Science**
Institution:	**Umm Al-Qura 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: Level 2/ 1st year
4. Pre-requisites for this course (if any)**:**
5. Co-requisites for this course (if any)**:**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	60	100%
2	**Blended**		
3	**E-learning**		
4	**Correspondence**		
5	**Other**		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	45
2	**Laboratory/Studio**	42
3	**Tutorial**	
4	**Others** (specify) exam and quizzes	6
	Total	93
Other Learning Hours*		
1	**Study**	89
2	**Assignments**	15
3	**Library**	
4	**Projects/Research Essays/Theses (practical)**	22
5	**Others** (specify) exam and quizzes	20
	Total	146

***** The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

The course will cover the principle of physics, such as measurements, work and energy, Newton's laws, heat, fluid mechanics, and light. This course will provide a conceptual and experimental background in physics sufficient to enable students to take courses that are more advanced in related fields.

2. Course Main Objective

After completing this course student should be able to:

1. Define the concepts of the measurements.
2. Define the concepts measuring length.
3. Define the concepts of measuring time.
4. Define the concepts of measuring weight.
5. Differentiate between the distance, the position, and the displacement.
6. Differentiate between the speed and the velocity.
7. Differentiate between the average velocity and the instantaneous velocity.
8. Define the concepts of the acceleration.
9. Differentiate between the average acceleration and the instantaneous acceleration.
10. Differentiate between the linear acceleration and the free fall acceleration.
11. Differentiate between the vectors and the scalars
12. Analyze the vectors into their components.
13. Calculate the multiplication of the vectors.
14. Define the concepts of the force.
15. Define the relation between the force and the acceleration.
16. Apply Newton's laws of motion.
17. Differentiate between the Work and the Energy.
18. Differentiate between the Energy and the power.
19. Define the Kinetic energy of the body.
20. Define the concept of the density of the body.
21. Define the concept of the pressure within the fluid.
22. Define the concept of Pascal principle.
23. Define the concept of Archimedes' principle.
24. Define the concept of Bernoulli's Equation.
25. Define the concept of the temperature

26. Differentiate between the Celsius Scale and Fahrenheit scale of temperature.
27. Define the laws of reflection through plane mirrors and spherical mirrors.
28. Define the laws of refraction through thin lenses.
29. Apply the laws of thin lenses.

In addition to these items, the students should gain practical skills through performance some experimental class.

3. Course Learning Outcomes

CLOs		Aligned PLOs
1	**Knowledge:**	
1.1	**Define** the physical quantities, physical phenomena, and basic principles of physics related to the course.	K1
1.2	**Express** the physical laws related to the course using mathematics.	K2
1.3	**Record** the physical quantity at the lab.	K3
2	**Skills:**	
2.1	**Calculate** the physical quantity related to the course.	S1
2.2	**Solve** physical problems	S1
2.3	**Drive** physics laws.	S2
2.4	**Determine** some physical quantity at the lab.	S3
3	**Competence:**	
3.1	**Work** effectively in groups.	C1
3.2	**Show** responsibility for self-learning to be aware with recent developments in physics.	C2

C. Course Content

No	List of Topics	Contact Hours
1	❖ **Measurement** 1- The physical quantities, standards, and Units. 2- The international system of units. 3- The Standard of time 4- The Standard of length 5- The Standard of Mass 6- Precision and significant figures. 7- Dimensional analysis.	**6**
2	❖ **Vectors** 1- Vectors and Scalars. 2- Adding vectors : graphical methods 3- Components of vectors. 4- Adding vector: component method. 5- Multiplications of vectors. 6- Vector laws in physics.	**6**

3	❖ **Motion in one dimension** 1- Particles kinematics. 2- Description of motion 3- Average velocity 4- Instantaneous velocity. 5- Accelerated motion. 6- Motion with Constant Acceleration 7- Freely falling Bodies. 8- Measuring free fall acceleration.	**3**
4	❖ **Motion in two and three dimensions** 1- Position, velocity, and acceleration. 2- Motion with constant acceleration 3- Projectile motion 4- Uniform circular motion 5- Velocity and acceleration vectors in circular motion	**3**
5	❖ **Force and motion** 1- Position, velocity, and accelerations 2- Motion with constant acceleration. . 3- Newtons first and second laws. 4- Forces. 5- Newtons second law 6- Newton's third law. 7- Units of force 8- Weight and mass 9- Measuring forces 10- Applying Newton's laws.	**6**
6	❖ **Work and Energy** 1. Work done by constant force. 2. Work done by a variable force: one dimensional case. 3. Work done by a variable force: two dimensional case. 4. Kinetic energy and work-energy theory. 5. Power.	**3**
7	❖ **Fluids Statics** 1. Fluids and Solids 2. Density and pressure. 3. Variation of density in a fluid at rest. 4. Pascal Principle. 5. Archimedes' Principle. 6. Surface tension.	**3**
8	❖ **Fluid dynamics** 1. General concepts of fluid flow 2. Streamlines and the equation of continuity.	**3**

	3. Bernoulli's Equation 4. Application of Bernoulli's Equation 5. Viscosity.	
9	❖ **Temperature, Heat and the first law of Thermodynamics.** 1. Heat: Energy in transit 2. Heat capacity and specific heat. 3. Heat capacity of solids 4. Temperature. 5. The Celsius and Fahrenheit Scales. 6. Heat transfer.	**6**
10	❖ **Reflection and refraction of light at plane surface** 1. Reflection and Refraction 2. Deriving the law of refrlection 3. Image formation by plane mirrors. 4. Deriving the law of refraction. 5. Total internal reflection.	**3**
11	❖ **Reflection and refraction of light at plane surface** 1. Spherical mirrors 2. Spherical refracting surfaces. 3. Thin lenses 4. Compound optical systems 5. Optical instruments	**3**
	❖ **Experimental part at the lab of general physics** 1. Safety Procedures in the Lab 2. Introduction and Graphing and Data Analysis 3. Fine Measurements 4. Force Table 5. Free Fall 6. Position and velocity and acceleration 7. Archimedes' Principle 8. Determination of Surface Tension of a liquid 9. Determining the Viscosity of a Fluid 10. Specific Heat 11. Determining the Refractive Index of a material 12. Focal length of a convex lens	**15**
Total		60

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**		
1.1	Define the physical quantities, physical phenomena, and basic principles of physics related to the course.	1- Start each class with welcoming the students. 2- Give a general idea about the content of the lecture. 3- Demonstrate the basic principles through lectures, using pictures and diagrams. 4- Discuss each item with the student through the lecture. 5- Lecturing method: Board, Power point. Discussions Brain storming	Solve some example during the lecture. Discussions during the lectures Exams: a) Quizzes (E-learning) b) Short exams (mid- term exams) c) Long exams (final) d) Oral exams
1.2	Express the physical laws related to the course using mathematics.		
1.3	Record the physical quantity at the lab.	1.teaching the student how to record the reading using different gauge correctly and safely at the lab. 2. teaching the stutnet how to desinge a suitable table to dominstrate the reading obtaind through the expermintal work.	• Tabulate the results, and • Dominstrate the results in a scientific Reports. • Lab assignments • Exam.
2.0	Skills		
2.1	Calculate the physical quantity related to the course.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
2.2	Solve physical problems	1. Preparing main outlines for teaching. 2. Following some proofs. 3. Define duties for each chapter 4. Encourage the student to look for the information in different references. 5. Ask the student to attend lectures for practice solving problem.	1. Exams (Midterm, final, quizzes) 2. Asking about physical laws previously taught 3. Writing reports on selected parts of the course. 4. Discussions of how to simplify or analyze some phenomena.
2.3	Drive physics laws.		
2.4	Determine some physical quantity at the lab.	1.Distribute the student at the lab as a teamwork. 3. Perform the paractical part of the experiments. 4. Collecting the data using different instruments. 5. Demonstrate the results as atables and grahps. 6.Analysing the results. 7.Determingin some physical quantity using the results. 8. Write the reports about the experiment. 9.Discussion with the student about the results	Writing scientific Reports. Lab assignments Exam.
3.0	Competence		
3.1	Write scientific reports.	Inform the students about the followings:	1. Checking report on internet. 2. Discussion.
3.2	Show responsibility for self-learning to be aware with recent developments in physics.		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		1. How to search the internet and use the library. 2.How to cover missed lectures. 3.How to summarize lectures or to collect materials of the course. 4.How to solve difficulties in learning: solving problems – enhance educational skills. 5.Give students tasks of duties. 6.How to write reports. 7. How to work as a teamwork. 8.How to lead a Teamwork. 9. How to discuss with others .	3. calculate the accuracy of the measure quantity. 4. Presenting the results.

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Home works	All weeks	5 %
2	Scientific activities	All weeks	5 %
3	Midterm Exam (theoretical)	9th week	20%
4	Lab. Reports (Practical)	11th week	10%
5	Final Exam (Practical)	15th week	10%
6	Final Exam (theoretical)	16th week	50%
7	**Total**		**100%**

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

E. Student Academic Counseling and Support

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Halliday and Resnick and Jearal Walker, " Fundamental of Physics" 8 edition, Wiley, 2008.
Essential References Materials	Physics, 4th edition , By: Halliday, Resnick, and Krane, Wiley (1992) Physics , 4th edition, By: J. Walker (2010)
Electronic Materials	
Other Learning Materials	

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	There are enough classrooms provided with a good accommodation, including good air condition, good Data show, suitable white board. There are enough laboratories for experimental physics, provided with air conditions, good data show, and experimental equipment.
Technology Resources (AV, data show, Smart Board, software, etc.)	In each class room and laboratories, there is a data show, and board.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	Each Class room and laboratories require a TV screen at least 65 inch-and smart, and double layer white board.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Students	Quashinear
Effectiveness of student assessment	Instructor	Exams
Extent of achievement of course learning outcomes	Instructor	Course report

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Quality of learning resources	Instructor	Course report

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	Physics Depratment, Faculty of Applied Science, Umm AlQura University
Reference No.	
Date	