



Course Specification

DIPLOMA

Course Title: **Basic science for engineering**

Course Code: **APRT1202**

Program: **Renewable energy technologies**

Department: **Diploma Department**

College: **The Applied College**

Institution: **Umm Al-Qura University**

Version: **1**

Last Revision Date: **10 February 2025**



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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: (1st Level / 1st Year)

4. Course General Description:

1. Course Description

The course will cover the principles of general physics, such as measurements, unit and dimensions, vectors, Motion in one-dimension, Projectile motion, Newton's laws, work and energy.

Also, the course covers the basic principles of physics related to environment, like thermodynamics, energy production, light interaction with matter, as well as mass and energy transfer. Furthermore, conventional and non-conventional energy

. The course will also provide a conceptual background of experimental physics sufficient to enable students to take courses that are more advanced in related fields.

5. Pre-requirements for this course (if any):

6. Co-requisites for this course (if any):

7. Course Main Objective(s):

- 1- Understanding the principles of general physics, such as measurements, unit and dimensions, vectors, Motion in one dimension, Newton's laws, circular motion work and energy
- 2- Understanding the conceptual background of experimental physics sufficient to enable students to take courses that are more advanced in related fields
- 3- the basic principles of Projectial motion, thermodynamics, energy production, light interaction with matter
- 4- the basic principles of physics related to mass and energy transfer
- 5- This course aims to introduce students to the application of core physical concepts to the conventional and non-conventional energy .



- 6- The course will demonstrate how physics is fundamental to understanding renewable energy technologies and basic science for engineering.

Course Main Objective

The main goal of this course is to give students specific details in the research point of the project which need more theoretical analysis.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3	100%
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> 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	14
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		75

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

1.0	Knowledge and understanding			
1.1	Describe the Scope of General and Environmental Physics.	K1	Lectures and Interactive Discussions	Written Exams (Mid-Term and Final Exams), Quizzes.
1.2	Define the physical quantities related to the course.	K3	Lectures and Interactive Discussions	Written Exams (Mid-Term and Final Exams), Quizzes.





1.3	Describe the concepts and physical laws related to the course using the mathematical formula.	K2	Lectures and Interactive Discussions	Written Exams (Mid-Term and Final Exams), Quizzes.
2.0	Skills			
2.1	Apply physics laws to calculate physical quantities related to the course.	S1	Interactive Discussions	Written Exams (Mid-Term and Final Exams), Quizzes
2.2	Solve, evaluate, or calculate the: mass and energy transfer, and effects of light and heat through different environmental systems.	S3	Interactive Discussions	Written Exams (Mid-Term and Final Exams), Quizzes
3.2	Explain physics concepts, processes, and results, both orally and in writing related Environmental Physics.	S1	Interactive Discussions	Written Exams (Mid-Term and Final Exams),
3.0	Values, autonomy, and responsibility			
3.1	Work cooperatively in a small group environment	V1	Individual and Group Presentations	Presentations

C. Course Content

No	List of Topics	Contact Hours
1.	Measurement	3
2.	Motion Along a Straight Line	3
3.	Motion in Two and Three Dimensions	3
4.	Vectors	3
5.	Force and Motion	3
6.	Fluid Statics	3
7.	Fluid Dynamics	3
8.	Force and Motion-I	3
9.	Force and Motion-II	3
10.	Heat and thermodynamic	3
11.	. Properties of Gases and Liquids.	3
12.	Transport of Heat, Mass, and Momentum	3
13.	Basic of circuits	3
14.	Basic of electronics	3





15.	Waves Motion	3
Total		45

C.2 Experimental Content

No	List of Topics	Contact Hours
3.	Graph	1
4.	Measurements	1
3.	Simple pendulum	1
4.	Density of sphere	1
5.	Sound wave	1
6-	Elastic constant of spiral spring	1
7.	Viscosity	1
8.	Force table & equilibrium of forces	1
9.	Laws of motion using Fletcher's car	1
10.	Specific heat	1
11.	Thermal conductivity of slab	1
12.	P-N Junction	1
13.	Photo diode	1
14.	Solar cell	1
Total		14

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	5	10
2.	Mid-Term Exam	8	20
3.	Presentations	12	10
4.	Homework	All weeks	10
5.	Final Exam	16	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	<ol style="list-style-type: none"> 1. John L. Monteith† and Mike H. Unsworth. Principles of Environmental Physics: Plants, Animals, and the Atmosphere. 3rd Edition. 2011. John Wiley & Sons, Ltd. 2. Halliday & Resnick, Jearl Walker, "Fundamentals of Physics" 10th Edition (2018)
Supportive References	<ol style="list-style-type: none"> 1. Nigel Mason and Peter Hughes. Introduction to Environmental Physics. 2001 by Taylor & Francis Group, LLC. 2. j. Jeffrey Peirce, Ruth F. Weiner, and P. Aarne Vesilind. Environmental Pollution and Control. 4rd Edition. 1997. Elsevier Science & Technology Books. 3. Kyle Forinash. Foundations of Environmental Physics. 2010. Island Press. <p>Peter Smithson, Ken Addison and Ken Atkinson. Fundamentals of the Physical Environment. 4th edition. 2008. Taylor & Francis Group.</p>
Electronic Materials	
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms
Technology equipment (projector, smart board, software)	Data show
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Faculty	Direct (project, HW, Quiz, midterm and final exam)
Effectiveness of Students assessment	Students	Indirect (Student Survey)
Quality of learning resources	Program Coordinator	Direct analysis
The extent to which CLOs have been achieved	Program Coordinator	Direct analysis
Other		

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

Assessment Methods (Direct, Indirect)





G. Specification Approval

COUNCIL /COMMITTEE	Umm Al-Qura University Council
REFERENCE NO.	851141114462/190394
DATE	22/11/1446

