



# Course Specification

## (Bachelor)

**Course Title:** Environmental Physics

**Course Code:** APEP2601

**Program:** : Diploma- Technology of Environmental Protection

**Department:** Biology

**College:** Faculty of science

**Institution:** Umm Al-Qura University

**Version:** 2

**Last Revision Date:** 12/ 2024

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## A. General information about the course:

### 1. Course Identification

#### 1. Credit hours: (3 Credits )

3 (2 theoretical + 1 practical)

#### 2. Course type

- A. ☐ University ☐ College ☒ Department ☐ Track ☐ Others
- B. ☒ Required ☐ Elective

#### 3. Level/year at which this course is offered: ( .....)

#### 4. Course General Description:

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

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 related to environmental systems such as atmospheric, ocean or solid earth.

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

NA

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

NA

#### 7. Course Main Objective(s):

- 1- Understanding the principles of general physics, such as measurements, vectors, Motion in one dimension, Newton's laws, 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 physics related to environment, like thermodynamics, energy production, light interaction with matter
- 4- the basic principles of physics related to mass and energy transfer related to environmental systems such as atmospheric, ocean or solid earth. Vision Optics Basics, errors, and correction
- 5- This course aims to introduce students to the application of core physical concepts to the Earth system, with special focus on: atmospheric radiation, greenhouse gases, and pollution.
- 6- The course will demonstrate how physics is fundamental to understanding natural and human influences on climate and atmospheric composition.

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





No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	2	80%
2	E-learning		20%
3	Hybrid <ul style="list-style-type: none"> <li>Traditional classroom</li> <li>E-learning</li> </ul>		
4	Distance learning		

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

No	Activity	Contact Hours
1.	Lectures	30h
2.	Laboratory/Studio	14h
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		3

## 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	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	S3	Interactive Discussions	Written Exams (Mid-Term and





Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	light and heat through different environmental systems.			Final Exams), Quizzes
3.2	Explain physics concepts, processes, and results, both orally and in writing related Environmental Physics.	<b>S1</b>	Interactive Discussions	Written Exams (Mid-Term and Final Exams),
<b>3.0</b>	<b>Values, autonomy, and responsibility</b>			
3.1	Work cooperatively in a small group environment	<b>V1</b>	Individual and Group Presentations	Presentations

## C. Course Content

### C.1 Theoretical Content

No	List of Topics	Contact Hours
1.	Measurement	2
2.	Motion Along a Straight Line	2
3.	Motion in Two and Three Dimensions	2
4.	Vectors	2
5.	Force and Motion	2
6.	Fluid (static and dynamic)	2
7.	The Scope of Environmental Physics.	2
8.	Heat and thermodynamic	2
9.	Properties of Gases and Liquids.	2
10.	Transport of Heat, Mass, and Momentum.	2
11.	Transport of Radiant Energy.	2
12.	Radiation Environment.	2
13.	Radiative Properties of Natural Materials.	2
14.	Interception of Radiation by Plant and Animal Canopies.	2
15.	Steady State Heat Balance.	2
<b>Total</b>		<b>30</b>



## C.2 Experimental Content

No	List of Topics	Contact Hours
3.	Graph	1
4.	Simple pendulum	1
3.	Measurements	1
4.	Density of sphere	1
5.	Sound wave	1
6.	Elastic constant of spiral spring	1
7.	Viscosity	1
8.	Specific heat	1
9.	Thermal conductivity of slab	1
10.	UV detection	1
11.	Noise and visual pollution	1
12.	Nuclear Radiation detection	1
14.	Noise detection	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"> <li>John L. Monteith† and Mike H. Unsworth. Principles of Environmental Physics: Plants, Animals, and the Atmosphere. 3<sup>rd</sup> Edition. 2011. John Wiley &amp; Sons, Ltd.</li> <li>Halliday &amp; Resnick, Jearl Walker, "Fundamentals of Physics" 10th Edition (2018)</li> </ol>
Supportive References	<ol style="list-style-type: none"> <li>Nigel Mason and Peter Hughes. Introduction to Environmental Physics. 2001 by Taylor &amp; Francis Group, LLC.</li> </ol>



	<p>2. j. Jeffrey Peirce, Ruth F. Weiner, and P. Aarne Vesilind. Environmental Pollution and Control. 4<sup>th</sup> Edition. 1997. Elsevier Science &amp; Technology Books.</p> <p>3. Kyle Forinash. Foundations of Environmental Physics. 2010. Island Press.</p> <p>Peter Smithson, Ken Addison and Ken Atkinson. Fundamentals of the Physical Environment. 4<sup>th</sup> edition. 2008. Taylor &amp; Francis Group.</p>
Electronic Materials	
Other Learning Materials	

## 2. Required Facilities and equipment

Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms, , exhibition rooms
<b>Technology equipment</b> (Projector, smart board, software)	Projector
<b>Other equipment</b> (Depending on the nature of the specialty)	

## F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students and Faculty	Direct
Effectiveness of students' assessment	Faculty and Program Leaders	Direct
Quality of learning resources	Students, Faculty and Program Leaders	Indirect
The extent to which CLOs have been achieved	Faculty and Program Leaders	Indirect
<b>Other</b>		

**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.	851141114462/190635
DATE	22/11/1446