



Course Specification

(Bachelor)

Course Title: **Environmental Physics**

Course Code: **PHYS 0204**

Program: **BSc in Physics and BSc in Physics of Renewable Energy and Environment**

Department: **Physics**

College: **Science**

Institution: **Majmaah University**

Version: **2**

Last Revision Date: **8/12/2024**



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A. General information about the course:

1. Course Identification

1. Credit hours: 3 (3, 0, 0)

2. Course type

A. University College Department Track Others
B. Required Elective

3. Level/year at which this course is offered: (4th level/2nd year)

4. Course General Description:

Environmental Physics is a course that enables students to explore the physical principles underlying environmental processes and issues. It bridges the gap between physics and environmental science, focusing on the application of physical laws to understand, address, model, and treat environmental challenges.

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

PHYS 0202 General Physics 2

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

None

7. Course Main Objective(s):

- Develop a strong understanding of the physical principles underlying environmental processes.
- Apply physics concepts to analyze environmental problems and propose solutions.
- Critically evaluate the impact of human activities on the environment.
- Develop skills in data analysis and modeling of environmental systems.
- Gain practical experience in environmental monitoring and measurement techniques.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100 %
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 		



No	Mode of Instruction	Contact Hours	Percentage
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
5.	Others (specify)	
Total		45

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	Understand how mathematics and physics can be applied in the environmental areas	K2	Lecture Exercises Quizzes Problem solving	Homework Quizzes Exams
1.2	Acquire a basic knowledge of physical methods used to save environment.	K1, K2	Lecture Exercises Quizzes Problem solving	Homework Quizzes Exams
1.3	have basic knowledge about meteorology, hydrology and geophysics	K1, K2	Lecture Exercises Quizzes Problem solving	Homework Quizzes Exams
1.4	Be able to investigate the physics of solar	K1	Lecture Exercises Quizzes	Homework Quizzes Exams



Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	radiation and solar cells.		Problem solving	
1.5	Be aware with the applications of the solar energy.	K1	Lecture Quizzes	Homework Quizzes Exams
2.0	Skills			
2.1	Develop the essential ability to solve practical environmental problems.	S1, S2	Lecture Exercises discussions	Homework Exams Quizzes
2.2	Identification of physical mechanisms involved in environmental issues	S1, S2	Lecture Exercises	Homework Exams Quizzes
2.3	Assessment of the complexity of environmental physics problems.	S3	Lecture Exercises discussions	Homework Exams Quizzes
2.4	Design of solutions for environmental degradation problems	S3	Lecture Exercises discussions	Homework Exams Quizzes
2.5	Relate the equations of physics to serve environment.	S3	Lecture Exercises Solving Problems	Homework Exams Quizzes
2.6	To know how to use the computer program to analyze the data, and make some simulation	S3	Lecture Exercises Discussions Simulation	Homework Exams Quizzes
3.0	Values, autonomy, and responsibility			
3.1	To develop the team working skills necessary to perform effectively.	V2	Lecture Group discussion	Homework, Classwork
3.2	To develop the ability to argue	V2	Lecture Group discussion	Homework, Classwork





Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
	scientifically with the instructor.			

C. Course Content

No	List of Topics	Contact Hours
1.	Overview of environmental challenges, physical principles, and their applications.	3
2.	Layers of the atmosphere and their characteristics.	3
3.	Light interaction with the atmosphere (e.g., scattering, absorption, and refraction).	3
4.	Earth's structure, seismic activity, volcanoes, and plate tectonics.	6
5.	Impact of noise pollution on ecosystems, wildlife behavior, and urban environments. Noise reduction techniques and their application in various environments.	3
6.	Concepts of radiation, heat transfer, and Earth's energy budget.	6
7.	Mechanisms, causes, and impacts of global warming and climate change.	3
8.	Types of pollution (air, water, soil), sources, and consequences	3
9.	Case studies on pollution in urban and rural settings, understanding the transport mechanisms of pollutants in air and water, and their impact on human health and ecosystems.	3
10.	Introduction to climate modeling and simulation techniques, exploring different modeling approaches and their applications in environmental science.	3
11.	Renewable Energies: Wind Energy, Solar Energy, Hydroelectric Energy, Biofuels, Geothermal Energy, Wave Energy	9
Total		45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Midterm exam 1	7 th	15 %
2.	Midterm exam 2	13 th	15 %
3.	Homework/presentation	--	10 %
4.	Quizzes	4 th and 10 th	20 %
5.	Final exam	16 th	40 %

*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	1- Environmental physics: sustainable energy and climate change. Boeker, E., & Van Grondelle, R. (2011). John Wiley & Sons. 2- Energy, Physics and the Environment : by McFarland, E. L., Hunt, J. L., Campbell, J. L., & Howes, R. H. (1995)
Supportive References	Environmental Physics , Clare Smith, Routedledge, (2005), 3 rd edition
Electronic Materials	Saudi Digital Library (SDL) https://www.wikipedia.org/ NASA Climate change : https://science.nasa.gov/climate-change/ NOAA (National Oceanic and Atmospheric Administration): https://www.noaa.gov/ World Meteorological Organization (WMO): https://wmo.int/
Other Learning Materials	Excel software for drawing graphs. MS Office for writing reports and presentations.

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture room with at least 25 seats. Auditorium of a capacity of not less than 100 seats for large lecture format classes.
Technology equipment (projector, smart board, software)	A smart board to write on and computer.
Other equipment (depending on the nature of the specialty)	Library, Seminar Room, and Wi-Fi internet connections.

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Internal Reviewer committee	Direct
Effectiveness of Students assessment	Students	indirect
Quality of learning resources	Qiyas center, stockholder and others	Direct
The extent to which CLOs have been achieved	Peer Reviewer	Direct
Other		

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

Assessment Methods (Direct, Indirect)





G. Specification Approval

COUNCIL /COMMITTEE	PHYSICS DEPARTMENT COUNCIL
REFERENCE NO.	16
DATE	30/12/2024

