

Course Syllabus

1	Course title	Environmental Physics	
2	Course number	0302300	
3	Credit hours	3	
	Contact hours (theory, practical)	3 (theory)	
4	Prerequisites/corequisites	None	
5	Program title	Bsc in Physics	
6	Program code		
7	Awarding institution		
8	School	Science	
9	Department	Physics	
10	Course level	2 nd year	
11	Year of study and semester(s)		
12	Other department(s) involved in teaching the course		
13	Main teaching language	English	
14	Delivery method	<input checked="" type="checkbox"/> Face to face learning <input checked="" type="checkbox"/> Blended <input type="checkbox"/> Fully online	
15	Online platforms(s)	<input type="checkbox"/> Moodle <input type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input checked="" type="checkbox"/> Others: Microsoft Teams	
16	Issuing/Revision Date	2024	



مركز الاعتماد
وضمان الجودة
ACCREDITATION & QUALITY ASSURANCE CENTER

17 Course Coordinator:

Name: Prof. Tareq Hussein

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18 Other instructors:

Name:

Office number:

Phone number:

Email:

Contact hours:

Name:

Office number:

Phone number:

Email:

Contact hours:

19 Course Description:

Elements of the environment; pollution (in water; soil; and air) and methods of handling pollution levels; transport processes (micro scale, local, regional and global); introduction to atmospheric aerosols: formation; deposition and removal; physical properties; population of aerosol particles and concentrations; dynamics of single aerosol particles (motion in the fluid; drag force; settling; etc.); transformation of atmospheric aerosols: condensation, coagulation, impacts of air pollution.



20 Course aims and outcomes:

A- Aims:

The course *Environmental Physics* (0 302 300) is dedicated to make the prospective student familiar with environmental topics and related physical processes. This course is an introductory level for which the students are expected to be familiar with basic mathematical principles, sufficient understanding for the dynamics of single particles, gases properties, optical properties of matter, etc.

B- Students Learning Outcomes (SLOs):

For purposes of mapping the course SLOs to the physics program SLOs, at the successful completion of the physics program, graduates are expected to be able to:

1. An ability to identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.
2. An ability to formulate or design a system, process, procedure or program to meet desired needs.
3. An ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions.
4. An ability to communicate effectively with a range of audiences.
5. An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.
6. An ability to function effectively in teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.

Upon successful completion of this course, students will be able to:

Course SLOs	Program SLOs	SLO (1)	SLO (2)	SLO (3)	SLO (4)	SLO (5)	SLO (6)	SLO (7)	SLO (8)	SLO (9)
1. Discuss the interaction between the elements of the Environment (air, water, soil, creatures, human activities, etc.)			✓							
2. Describe the concept of the mass balance equation			✓							
3. Define and list the Types of aerosols			✓							
4. Give a quantitative representation of gas pollutants			✓							
5. Acquire knowledge of the Dynamics of single aerosol particles			✓							
6. Investigate the Health Impacts and Respiratory Deposition of Aerosol Particles			✓							

21. Topic Outline and Schedule:

Week	Lecture	Topic	Intended Learning Outcome	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1	Within discussion with the students make a schematic diagram and point out the elements of Environment (air, water, soil, creatures, human activities, etc.)		Face to face	Teams		Assignments Quizzes and Exams	
	1.2	Discuss the interaction between these elements						
	1.3	Pont out the existence of the Humans on the Earth, the location of the Earth within the Solar system, and the layers of the Earth and the Atmosphere						
2	2.1	Solar system						
	2.2	Earth layers						
	2.3	Atmospheric layers						
3	3.1	Introduce the concept of pollution in general Discussion the interaction between the air and soil and water						
	3.2	Focus on the convection (vertical and horizontal) and how the pollutants are transported within the atmosphere, a city, a building, a dwelling, etc						
	3.3	Describe the concept of the mass balance equation and how to control the emissions... Give examples on the mass balance equation						
4	4.1	Properties of gases						
	4.2	Atmospheric aerosols: what is an aerosol						
	4.3	Types of aerosols (based on formation/sources/com position)						
5	5.1	Quantitative representation of gas pollutants (ppm, ppb, and ppt)						
	5.2	Quantitative representation (volume						

	5.3	and surface area concentrations) Quantitative representation of aerosols (mass and number concentrations)						
6	6.1	Physical properties						
	6.2	Population of aerosols and modal properties						
	6.3	Bioaerosols						
7	7.1	Dynamics of single aerosol particles (motion in the fluid, drag force, settling, etc.)						
	7.2							
	7.3	Uniform particle motion.						
8	8.1	Straight-line acceleration and curvilinear particle motion.						
	8.2							
	8.3							
9	9.1	Adhesion of particles.						
	9.2	Brownian motion and diffusion.						
	9.3	Thermal and radiometric forces.						
10	10.1							
	10.2							
	10.3							
11	11.1	Electric properties.						
	11.2	Optical properties.						
	11.3	Deposition and removal						
12	12.1							
	12.2							
	12.3							
13	13.1	Formation and transformation processes						
	13.2	Condensation						
	13.3	Coagulation						
14	14.1	Filtration.						

	14.2							
	14.3							
15	15.1	Impacts of aerosol particles						
	15.2	Health effects and deposition in respiratory system						
	15.3							

22 Evaluation Methods:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	SLOs	Period (Week)	Platform
Assignments and quizzes	30		1,2,3,4,5,6		Face to face
Mid Exam	30		1,2,3	Week 8	Face to face
Final Exam	40	All topics	1,2,3,4,5,6	Week 16	Face to face

23 Course Requirements

(e.g: students should have a computer, internet connection, webcam, account on a specific software/platform...etc):

24 Course Policies:

A- Attendance policies:

No more than 15% of classes can be missed under any circumstances. The students are supposed to be on time for each session and will not be admitted after 10 minutes from the starting time.

B- Absences from exams and submitting assignments on time:

Assignments are only taken if submitted on time and no make ups for short quizzes.



C- Health and safety procedures:

The lectures are located in proper locations for best lecturing conditions

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Any act of cheating or plagiarism is not tolerated and the students are clearly required to submit their own work.

E- Grading policy:

Assignments and quizzes: 30% Midterm: 30% Final Exam: 40%

F- Available university services that support achievement in the course:

25 References:

A- Required book(s), assigned reading and audio-visuals:

Hinds W. C. Aerosol technology. 1999, 2nd edition or more. New York, John Wiley & Sons.

Seinfeld J. H. and Pandis S. N. Atmospheric Chemistry and Physics: from air pollution to climate change. 1998 (or later editions), John Wiley and Sons, New York.

B- Recommended books, materials, and media:

26 Additional information:

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Name of Course Coordinator: - Prof. Tareq Hussein ---Signature: ----- Date: ----- --
Head of Curriculum Committee/Department: ----- Signature: ----- ---
Head of Department: ----- Signature: ----- -
Head of Curriculum Committee/Faculty: ----- Signature: ----- -
Dean: ----- Signature: -----