



Lahore University of Management Sciences

ChE312 – Fundamentals of Environmental Engineering

Fall 2021

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Course URL (if any)	

Course Basics				
Credit Hours	03			
Lecture(s)	Nbr of Lec(s) Per Week	02	Duration	1 hr 15 minutes
Recitation/Lab (per week)	Nbr of Lec(s) Per Week		Duration	
Tutorial (per week)	Nbr of Lec(s) Per Week		Duration	

Course Distribution	
Core	
Elective	BS Chemical Engineering
Open for Student Category	SSE Undergraduate Students
Close for Student Category	

Course Description
This course provides an introduction to the field of environmental engineering by examining both environmental processes and environmental systems. Topics addressed include water/wastewater treatment, air quality, water quality, solid and hazardous waste, risk assessment, and sustainable technology. The course balances a broad overview of environmental engineering with an in-depth investigation of selected environmental problems and technologies. An emphasis is placed on understanding the fundamental scientific principles that serve as the basis of environmental engineering applications. Methods for quantitative analysis of environmental systems are developed.

Course Prerequisite(s)
<ul style="list-style-type: none">NONE

Course Objectives
<ul style="list-style-type: none">Provide students the concept of environmental engineering regarding both environmental processes and environmental systems.Learn and comprehend the fundamental scientific principles that serve as the basis of environmental engineering applications.Train students for quantitative analysis of environmental systems.

Learning Outcomes
CLO1: Describe fundamental environmental engineering concepts and apply these to environmental problems
CLO2: Analyze and design water/wastewater treatment processes
CLO3: Calculate distribution of chemicals in environment
CLO4: Classify hazardous waste and identify laws related to hazardous waste

Grading Breakup and Policy



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Attendance: 0%
 Class Participation: 0%
 Homework: 10% (4 in total, 2.5 % each)
 Quizzes: 10% (4 in total, 2.5 % each)
 Midterm Examination : 35%
 Group project: 10%
 Final Examination: 35%

Examination Detail

Midterm Exam	Yes/No: Yes Combine/Separate: Separate Duration: 1.5 h Preferred Date: Week 8 Exam Specifications: Close books/close notes. Calculator, and two page cheat sheet are allowed.
Final Exam	Yes/No: Yes Combine/Separate: Separate Duration: 3 h Exam Specifications: Close books/close notes. Calculator, and two page cheat sheet are allowed.

COURSE OVERVIEW

Lecture	Topics	Reading Assignment (Text Book)
Week 1	Introduction to Environmental Engineering and Environmental System Overview, Environmental Risk Assessment and Management	Section 1-1, 1-5, 3-3, 3-4
Week 2	Water Supply – water chemistry and water quality, and Chemical Concepts	Section 5-1, 5-2, 5-3 and handouts
Week 3	Chemical Concepts, Water/wastewater treatment system	Section 5-3, 5-4, 5-5 and handouts
Week 4	Water Supply – coagulation and flocculation	Section 6-2,6-4 and handouts
Week 5	Water Supply – disinfection	Section 6-7 and handouts
Week 6	Water supply - adsorption	Handouts
Week 7	Water Supply – membrane processes, and Midterm	Section 6-9 and handouts
Week 8	Wastewater – water quality and biochemical oxygen demand	Section 8-1, 8-2, 8-4
Week 9	Wastewater – biological processes	Section 8-6, and handouts
Week 10	Mathematical models for fate and transport of chemicals in environment	Handouts
Week 11	Mathematical models for fate and transport of chemicals in environment	Handouts
Week 12	Introduction, Air Pollution – fundamentals and standards, Air Pollution – effects, origins, fate of pollutants	Section 9-1,9-2,9-3, 9-4, 9-5
Week 13	Solid Wastes – sources, management, processing, and disposal, waste to energy	Section 11-1,11-2, 11-3, 11-4, handouts
Week 14	Sustainability and Green Engineering	Section 13-1, 13-2, 13-3
Week 15	Final Exam	Section 13-2,13-3

Textbook(s)/Supplementary Readings

Required: Text:
 Davis and Cornwell, Introduction to Environmental Engineering, 5th edition, McGraw-Hill, 2013

Other Books:
 Mackenzie L. Davis and Susan J. Masten, Principles of Environmental Engineering and Science.
 A. Eduardo Sáez and James C. Baygents, Environmental Transport Phenomena.
 Richard D. Noble and Patricia A. Terry, Principles of Chemical Separations with Environmental Applications.
 Several articles and sets of notes will be provided at different points in the course and will be covered on examinations.

Teaching Philosophy



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My teaching efforts are centered on two folds: encouraging students to develop a solid understanding of basic concepts and then demonstrating the application of basic concepts in real-world problem solving.

Homework Policy

Homework must be submitted before 5:00 pm on the due date. Late homework and makeup exam will be allowed only for the cases of family emergency and illness with adequate supporting evidence (such as doctor's note).

Grading Policy

The final grade will be on a relative basis.

Academic Honesty

Homework and examinations in this course must comply with the policies described in the LUMS Student Handbook.

Harassment Policy

There is absolutely zero tolerance for any behavior that is intended, or has the expected result of making anyone uncomfortable and negatively impacts the class environment, or any individual's ability to work to the best of his/her potential. In case a differently-abled student requires accommodations for fully participating in the course, students are advised to contact the instructor so that they can be facilitated accordingly.

If you think that you may be a victim of harassment, or if you have observed any harassment occurring in the purview of this class, please reach out and speak to me. If you are a victim, I strongly encourage you to reach out to the Office of Accessibility and Inclusion at oai@lums.edu.pk or the sexual harassment inquiry committee at harassment@lums.edu.pk for any queries, clarifications, or advice. You may choose to file an informal or a formal complaint to put an end to offending behavior. You can find more details regarding the LUMS sexual harassment policy here: <https://mgshss.lums.edu.pk/lums-harassment-policy>. To file a complaint, please write to harassment@lums.edu.pk.

In addition to LUMS resources, SSE's Council on Belonging and Equity is committed to devising ways to provide a safe, inclusive and respectful learning environment for students, faculty and staff. To seek counsel related to any issues, please feel free to approach either a member of the council or email at cbe.sse@lums.edu.pk.