Course Specification
(Bachelor)

Course Title:	Environmental Engineering
Course Code:	CE 3501
Program:	Bachelor of Science in Civil Engineering
Department	Civil Engineering Department
College:	College of Engineering and Architecture
Institution	Umm Al Qura University
Version:	1
Last Revision Date:	31 January 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: (Level 7 / 4th Year)					
4. Course General Description:					
This course covers air and water quality, air and water pollution, and water and wastewater treatment processes. Students will learn essential design principles for water treatment systems and wastewater treatment systems.					
5. Pre-requirements for this course (if any)**:**					
CE 2602					
6. Co-requisites for this course (if any)**:**					
7. Course Main Objective(s):					
Students will develop their competence in the skills necessary to solve problems in the environmental engineering field.					

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	5	100%
2	E-learning		
3	Hybrid • Traditional classroom • E-learning		
4	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	**Lectures**	30
2.	**Laboratory/Studio**	45
3.	**Field**	
4.	**Tutorial**	
5.	**Others (specify)**	
Total		75

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	Demonstrate fundamental knowledge of environmental engineering.	K1; K2	Lectures Training tutorials	Assignments Quizzes Written exams
1.2	Identify the sources and classification of pollutants and their pathways in the environment.	K1	Lectures Training tutorials	Assignments Quizzes Written exams
1.3	Describe the environmental and health impacts of water pollution.	K1; K2	Lectures Training tutorials	Assignments Quizzes Written exams
2.0	**Skills**			
2.1	Professionally apply the preliminary studies of environmental engineering projects.	S1	Lectures Training Tutorials Small group work	Assignments Quizzes Written exams Term project
2.2	Design optimum water purification systems.	S1; S2	Lectures Training Tutorials Small group work	Assignments Quizzes Written exams Term project
2.3	Design optimum wastewater treatment systems.	S1; S2	Lectures Training Tutorials Small group work	Assignments Quizzes Written exams

Code	Course Learning Outcomes	Code of PLOs aligned with the program	Teaching Strategies	Assessment Methods
				Term project
2.4	Assess and compare the appropriate alternative solutions of the environmental problems.	S1; S3	Lectures Training Tutorials Small group work	Assignments Quizzes Written exams Term project
3.0	**Values, autonomy, and responsibility**			
3.1	Function effectively in modes of independent learning and multi-disciplinary teams.	V2	Lectures Training Tutorials Small group work	Term project
3.2	Comply with code requirements for the design of environmental engineering systems.	V1	Lectures Training Tutorials Small group work	Written exams Term project

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction - Environmental and Human Interaction	5
2.	Water Quality: (Definitions – Characteristics - Perspectives) and Water Pollution: (Groundwater Pollution - Surface Water Pollution)	5
3.	Air Quality: (Definitions – Characteristics - Perspectives) and Air Pollution	5
4.	Preliminary Studies: (Field Studies – Office Studies - Prediction of Population)	5
5.	Preliminary Studies: (Water Consumption – Design Flow - Design Period of Water and Wastewater treatment)	5
6.	Water Treatment Systems: (Coagulation–Flocculation)	5
7.	Water Treatment Systems: (Sedimentation)	5
8.	Water Treatment Systems: (Filtration and Disinfection)	5
9.	Introduction to Wastewater Treatment Systems	5
10.	Wastewater Treatment Systems: (Preliminary Treatment)	5
11.	Wastewater Treatment Systems: (Primary Treatment)	5
12.	Wastewater Treatment Systems: (Secondary Treatment: Activated sludge Treatment)	5
13.	Wastewater Treatment Systems: (Secondary Treatment: Trickling filters)	5
14.	Wastewater Treatment Systems: (Tertiary Treatment)	5
15.	Sludge Treatment and Disposal	5
Total		**75**

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	3-5-7-9-11	10
2.	Assignments	3-5-7-9-11	10
3.	Lab Assessment	4-6-8-10-12	10
4.	Midterm Exam	7	20
5.	Group Project	13	10
6.	Final Exam	16	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	Introduction to Environmental Engineering 5th Edition (January 2012), by Mackenzie L. Davis & David A. Cornwell, Publisher: McGraw-Hill Higher Education, ISBN-10: 0073401145, ISBN-13: 9780073401140
Supportive References	Environmental Engineering: Fundamentals, Sustainability, Design", 2nd Edition, James R. Mihelcic, Julie B. Zimmerman, Wiley, 2014. Wastewater Engineering: Treatment and Reuse 4th Edition (March 2014 by Metcalf & Eddy, Inc., George Tchobanoglous, Franklin Burton & David H. Stensel, Publisher: McGraw-Hill Higher Education, ISBN-10: 0070418780, ISBN-13: 9780070418783 Qasim, S. R. (1998). Wastewater treatment plants: Planning, Design, and Operation, Second Edition. CRC Press.
Electronic Materials	Institution of Civil Engineers
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classrooms for lectures and exams with students working on their laptops during the scheduled class hours. Well-equipped Laboratory.

Items	Resources
Technology equipment (projector, smart board, software)	A white board, Computer with multi-media, a printer, internet connection, and data show.
Other equipment (depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students Instructor Program leader	Indirect Direct Direct
Effectiveness of Students assessment	Independent member teaching staff	Direct
Quality of learning resources	Students Instructor	Indirect Indirect
The extent to which CLOs have been achieved	Instructor Student Program leader	Direct Indirect Direct
Other		

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	**CIVIL ENGINEERING COUNCIL**
REFERENCE NO.	**THE FIFTEENTH SESSION OF THE ACADEMIC YEAR 1446**
DATE	**30 APRIL 2025**

