

**Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Accreditation Department**



Academic Program and Course Description Guide

2026

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: Mosul University

Faculty/Institute: College of Engineering

Scientific Department: Environmental Engineering

Academic or Professional Program Name: Environmental Engineering

Final Certificate Name: BSc. of science in Environmental Engineering

Academic System: Course System + Bologna Process

Description Preparation Date: April, 2026

File Completion Date: April, 2026

Signature:

Head of Department Name:

Dr. Omar M. Abdulkareem

Date: 13/04/2026

Signature:

Scientific Associate Name:

Asst. prof. Dr. Ayman Talib Hammed

Date: 13-04-2026



The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department: **Rana**

Date: 13/4/2026

Signature:

Burhan Al



Approval of the Dean

Dean Office

1. Program Vision

Leadership and excellence in environmental engineering education and research, driving practical applications for sustainable development

2. Program Mission

Consolidating the societal role of environmental engineering by equipping graduates with the high professionalism and ethical standards needed to excel in the labor market and drive comprehensive sustainable development

3. Program Objectives

1. Build successful careers in environmental engineering and related fields through strong technical knowledge and professionalism
2. Develop and implement innovative engineering solutions that contribute to comprehensive sustainable development and address societal and environmental challenges.
3. Demonstrate leadership, effective communication, and professional ethics in diverse and multidisciplinary work environments."
4. Engage in lifelong learning and professional development through postgraduate studies and professional licensure

4. Program Accreditation

The Program is under review by the Iraqi Council for Accreditation of Engineering Education (ICAEE)

5. Other external influences

Deanship of Engineering College

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	8	16	11.1	
College Requirements	8	25	17.2	
Department Requirements	39	104	71.7	
Summer Training	1			

7– Program Description

First Level

Semester one, 30 ECTs, 1 ECTs = 25hrs

Code	Module	SSWL	USSWL	ECTs	Type	Pre-request
ENV111	Calculus 1	78	72	6.00	S	
ENV112	Statics	78	72	6.00	S	
ENV113	Engineering Drawing	93	82	7.00	S	
ENV114	Environmental Thermodynamics	48	52	4.00	S	
ENV115	Statistics	33	42	3.00	S	
UOM1011	Arabic1	33	17	2.00	B	
UOM1040	Democracy and Human Rights	33	17	2.00	B	

Semester two, 30 ECTs, 1 ECTs = 25hrs

Code	Module	SSWL	USSWL	ECTs	Type	Pre-request
ENV121	Calculus 2	78	72	6.00	S	ENV111
ENV122	Dynamics	48	77	5.00	S	
ENV123	Principles of Environmental Engineering	63	37	4.00	C	
ENV124	Geology	33	42	3.00	S	
ENV125	Drawing by Computer	63	112	7.00	S	ENV113
UOM1031	Computer1	48	27	3.00	B	
UOM1021	English 1	33	17	2.00	B	

Second Level

Semester three, 30 ECTs, 1 ECTs = 25hrs

Code	Module	SSWL	USSWL	ECTs	Type	Pre-request
ENV211	Mathematics	78	72	6.00	S	ENV121
ENV212	Fluids Mechanics	78	47	5.00	C	
ENV213	Chemistry	63	37	4.00	S	
ENV214	Engineering Surveying	78	22	4.00	S	
ENV215	Strength of Materials	48	52	4.00	S	
ENV216	Engineering Hydrology	33	42	3.00	S	
UOM2050	The Crimes of the Baath Party in Iraq	33	17	2.00	B	
UOM2022	English 2	33	17	2.00	B	

Semester four, 30 ECTs, 1 ECTs = 25hrs

Code	Module	SSWL	USSWL	ECTs	Type	Pre-request
ENV221	Water Quality Engineering	78	97	7.00	C	
ENV222	Concrete and Building Technology	78	72	6.00	S	
ENV223	Survey Applications and GIS	78	72	6.00	S	
ENV224	Microbiology	63	87	6.00	S	
UOM2012	Arabic2	33	17	2.00	B	
UOM2032	Computer2	63	12	3.00	B	

Third Level

Semester five, 30 ECTs, 1 ECTs = 25hrs

Code	Module	SSWL	USSWL	ECTs	Type	Pre-request
ENV311	Principles of Air pollution	48	77	5.00	C	
ENV312	Water Supply Networks	63	62	5.00	C	ENV212
ENV313	Solid Waste Engineering	63	62	5.00	C	
ENV314	Unit Operations & Processes	78	47	5.00	C	
ENV315	Sustainability Engineering	33	67	4.00	C	
ENV316	Engineering safety and ethics	48	27	3.00	C	
ENV317	Differential Equation	33	42	3.00	S	

Semester six, 30 ECTs, 1 ECTs = 25hrs

Code	Module	SSWL	USSWL	ECTs	Type	Pre-request
ENV321	Hydraulics Applications	63	62	5.00	C	
ENV322	Sewers Networks	63	87	6.00	C	
ENV323	Noise Pollution	33	67	4.00	C	
ENV324	Soil Mechanics	93	57	6.00	C	
ENV325	Engineering Project Planning and Design	33	17	2.00	C	
ENV326	Numerical Analysis	48	27	3.00	S	
ENV327	Reinforced Concrete	48	52	4.00	C	

Fourth Level

Semester seven, 30 ECTs, 1 ECTs = 25hrs

Code	Module	SSWL	USSWL	ECTs	Type	Pre-request
ENV411	Wastewater Treatment Plants Design	78	72	6.00	C	ENV314
ENV412	Structural Design	93	57	6.00	C	
ENV413	Engineering Project Management and Economy	63	37	4.00	C	
ENV414	Environmental Impact Assessment and Regulations	33	42	3.00	C	
ENV415	Soil and Ground Water Pollution	33	67	4.00	C	
ENV416	Fundamentals of Hazardous Waste Management	63	37	4.00	C	
ENV417	Engineering Project 1	33	42	3.00	C	

Semester eight, 30 ECTs, 1 ECTs = 25hrs

Code	Module	SSWL	USSWL	ECTs	Type	Pre-request
ENV421	Design of Water Treatment Plants	63	87	6.00	C	
ENV422	Industrial and Petroleum Liquid Waste	63	87	6.00	C	
ENV423	Air Pollution Control	48	102	6.00	C	ENV311
ENV424	Civil Drawing	48	77	5.00	C	
ENV425	Estimation and Specifications	48	52	4.00	C	
ENV426	Engineering Project 2	33	42	3.00	C	

7. Expected learning outcomes of the program

Knowledge	
Learning Outcomes (A)	A1-An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics. Graduate Outcome (i)
	A2-An ability to apply the engineering design process to produce solutions that meet specified needs by applying both analysis and synthesis in the design process. Graduate Outcome (ii)
	A3-An ability to perceive the continual necessity for professional knowledge growth and how to find, assess, assemble and apply it properly. Graduate Outcome (vi)
Skills	
Learning Outcomes (B)	B1-An ability to develop and conduct appropriate experimentation, analyze and interpret data and utilize engineering judgment to reach conclusions. Graduate Outcome (iii)
	B2-An ability to skillfully communicate orally with a gathering of people and in writing with various managerial levels. Graduate Outcome (iv)
	B3-An ability to perceive the continual necessity for professional knowledge growth and how to find, assess, assemble and apply it properly. Graduate Outcome (vi)
Ethics	
Learning Outcomes (C)	C1- The ability to perceive ethical and professional responsibilities in engineering cases and make brilliant judgments considering the consequences in worldwide financial, ecological and societal considerations. Graduate Outcome (v)
	C2- The ability to work adequately in teams, set up objectives, plan activities, meet due dates and manage risk and uncertainty. Graduate Outcome (vii)

8. Teaching and Learning Strategies

- Power point lectures
- Tutorial
- Laboratory experiments
- Computer laboratories
- Video lectures
- Team works
- Case Studies
- On-line lectures

9. Evaluation methods

- Mid–Term and final exams
- Quizzes
- Reports
- Laboratory exams
- Projects and technical reports

10. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Civil Engineering	Environmental Engineering			2	
Assist. Professor	Civil Engineering	Environmental Engineering			4	
Lecturer	Civil Engineering	Environmental Engineering			6	
Lecturer	Chemical Engineering	Metal Corrosion			1	
Assist. Lecturer	Civil Engineering	Environmental Engineering			5	

Professional Development

Mentoring new faculty members

The academic program aims to strengthen the knowledge of new faculty members in various educational fields, starting with the ability to manage the course and ending with the processes

and procedures that ensure the achievement of the targeted learning outcomes in the various programs. This can be achieved through:

- Holding educational courses for new faculty members to improve the quality of the educational learning process, which are: training on teaching methods, designing courses outlines, modern trends in university teaching, evaluating student learning, and preparing tests, in addition to the university's laws, regulations, instructions, and e-learning.
- Continuous evaluation of teaching staff members, full and partial-time faculty, to direct them to the areas they need to develop during their educational career
- Urging full and partial-time faculty to participate in teaching staff development courses held by the department or the continuing education unit at the university.

Professional development of faculty members

Continuous Learning Committee of Environmental Engineering Department organizes lectures and workshops for faculty members in various fields. The professional development activities held in the past five academic years are listed as follows:

- ✓ Development of education methods and E-learning/ 10
- ✓ Scientific publications/48
- ✓ Academic accreditation/3
- ✓ Miscellaneous seminars in the environmental engineering field/47
- ✓ Participation in conferences, seminars, workshops, and training courses outside Iraq/2
- ✓ Participation in conferences, seminars, workshops, and training courses inside Iraq/26

The faculty members actively participate in various workshops and training courses that fit their teaching, quality, and research skills. Last five academic years, eighteen faculty members presented a total skills development (10 workshops/13 continuous education courses). The department encourages faculty members to attend conferences, seminars, workshops, and training courses for professional development. Within the past five academic years, nine of faculties participated (as a Lecturer) in a total of 3 conferences and 3 symposiums. Regarding postgraduate studies, we would like to note that there are no postgraduate studies in the department yet.

11. Acceptance Criterion

The announced central admission results are based on the official website of the Ministry, and the announcement is a formal notice to the department to begin registering students on the day following the announcement of the results, and the registration period continues within a period of 15 (working days) starting from the date of register.

The students' files were received by the registration unit in the department and contain the documents required above, and they were checked by the registration unit.

The capacity of the Environmental Engineering Department is determined within the admission plan, where the committee determines the flag that indicates the number of new students required to be accommodated, then it is sent to the deanship, then the university, and then the ministry to obtain approval.

12. The most important sources of information about the program

- Guidebook for Mosul University

The departmental website:

<http://uomosul.edu.iq/pages/en/engineering/46848>

13. Program Development Plan

To improve the quality of education, promote the graduates' outcomes, and to meet the competencies requirements of increasingly complex societies, the department council decided to follow “Bologna process system of Education” which appropriate the European Credit Transfer and Accumulation System (ECTS) of study instead of courses system as a result of the policy of continuous improvement adopted by the department. Indeed, the new system of study will be launched since 2023–2024

The Bologna has been introduced with the expectation of maintaining the flowing advantages:

- It improves the education system by putting the student in the center of the learning process (Student– Centered Learning)
- More emphasis is laid on class interaction because of constant engagement between teachers and students
- There is an emphasis on gaining professional and practical skills during the study

- It will provide an opportunity to the students for continuous learning, assessment and feedback.
- It facilitates in evaluating the performance of students twice a year.
- It facilitates a better understanding of the subjects.

Program Skills Outlines											
				Required program Learning outcomes							
Year/Level	Course Code	Course Name	Basic or Optional	Knowledge			Skills			Ethics	
				i	ii	vi	iii	iv	vi	v	vii
First	ENV111	Calculus 1	Basic	*							
	ENV112	Statics	Basic	*							
	ENV113	Engineering Drawing	Basic	*							
	ENV114	Environmental Thermodynamics	Basic	*							
	ENV115	Statistics	Basic	*							
	UOM1011	Arabic1	Basic					*			
	UOM1040	Democracy and Human Rights	Basic							*	
	ENV121	Calculus 2	Basic	*							
	ENV122	Dynamics	Basic	*							
	ENV123	Principles of Environmental Engineering	Basic	*						*	
	ENV124	Geology	Basic	*							
	ENV125	Drawing by Computer	Basic						*		
	UOM1031	Computer1	Basic						*		
	UOM1021	English 1	Basic					*			

Program Skills Outlines											
				Required program Learning outcomes							
Year/Level	Course Code	Course Name	Basic or optional	Knowledge			Skills			Ethics	
				i	ii	vi	iii	iv	vi	v	vii
Second	ENV211	Mathematics	Basic	*							
	ENV212	Fluids Mechanics	Basic	*			*				
	ENV213	Chemistry	Basic	*			*				
	ENV214	Engineering Surveying	Basic	*			*				
	ENV215	Strength of Materials	Basic	*							
	ENV216	Engineering Hydrology	Basic	*							
	UOM2050	The Crimes of the Baath Regime in Iraq	Basic							*	
	UOM2022	English 2	Basic					*			
	ENV221	Water Quality Engineering	Basic	*			*				
	ENV222	Concrete and Building Technology	Basic	*			*				
	ENV223	Survey Applications and GIS	Basic	*			*				
	ENV224	Microbiology	Basic	*			*				
	UOM2012	Arabic2	Basic					*			
	UOM2032	Computer2	Basic						*		

Program Skills Outlines											
				Required program Learning outcomes							
Year/Level	Course Code	Course Name	Basic or optional	Knowledge			Skills			Ethics	
				i	ii	vi	iii	iv	vi	v	vii
Third	ENV311	Principles of Air pollution	Basic	*							
	ENV312	Water Supply Networks	Basic	*	*						
	ENV313	Solid Waste Engineering	Basic	*	*						
	ENV314	Unit Operations & Processes	Basic	*							
	ENV315	Sustainability Engineering	Basic	*						*	
	ENV316	Engineering safety and ethics	Basic	*						*	
	ENV317	Differential Equations	Basic	*							
	ENV321	Hydraulics Applications	Basic	*							
	ENV322	Sewers Networks	Basic	*	*						
	ENV223	Noise Pollution	Basic	*	*						
	ENV324	Soil Mechanics	Basic	*			*				
	ENV325	Engineering Project Planning and Design	Basic	*						*	*
	ENV326	Numerical Analysis	Basic	*							
	ENV327	Reinforced Concrete	Basic	*							

Program Skills Outlines											
				Required program Learning outcomes							
Year/Level	Course Code	Course Name	Basic or optional	Knowledge			Skills			Ethics	
				i	ii	vi	iii	iv	vi	v	vii
Fourth	ENV411	Wastewater Treatment Plant Design	Basic	*	*						
	ENV412	Structural Design	Basic	*	*						
	ENV413	Engineering Project Management and Economy	Basic	*						*	
	ENV414	Environmental Impact Assessment and Regulations	Basic	*						*	
	ENV415	Soil and Ground Water Pollution	Basic	*							
	ENV416	Fundamental of Hazardous Waste Management	Basic	*	*						
	ENV417	Engineering Project 1	Basic	*	*	*	*	*	*	*	*
	ENV421	Design of Water Treatment Plants	Basic	*	*						
	ENV422	Industrial and Petroleum Liquid Waste	Basic	*	*						
	ENV423	Air Pollution Control	Basic	*	*						
	ENV424	Civil Drawing	Basic	*				*	*		
	ENV425	Estimation and Specifications	Basic	*						*	
	ENV426	Engineering Project 2	Basic	*	*	*	*	*	*	*	*

University of Mosul
College of Engineering
Environmental Engineering Department
Fourth Level
Courses System

Fourth Level				
Fall Semester				
Course Code	Course	Theoretical hours	Practical hours	Credit Units
ENG425	Engineering management	2	-	2
ENG436	Environmental engineering and Sustainable	2	-	2
ENV440	Drinking water treatment	4	-	4
ENV441	Wastewater treatment design	4	-	4
ENV442	Environmental construction design	3	-	3
ENV443	Air pollution control	3	-	3
ENV444	Graduation Project I	2	-	2
Total		20	-	20

Fourth Level				
Spring Semester				
Course Code	Course	Theoretical hours	Practical hours	Credit Units
UOM	English language-Advanced	2	-	2
ENG426	Engineering economic	2	-	2
ENV445	Industrial and hazardous wastewater	4	-	4
ENV446	Soil and ground water pollution	3	-	3
ENV447	Construction drawing	2	-	2
ENV448	Estimation	2	-	2
ENV449	Graduation Project	2	-	2
ENV490	Advance water supply /	2	-	2
ENV491	Advanced wastewater treatment			
Total		19	-	19

Course Description
Environmental Engineering
Department
College of Engineering
University of Mosul
First Year / Bologna Process

1st Level

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)					Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)								
UGI	One	1	ENV111	Calculus 1	التفاضل والتكامل 1	English	3				2		3	78	72	150	6.00	S	
		2	ENV112	Statics	ميكانيك السكون	English	3				2		3	78	72	150	6.00	S	
		3	ENV113	Engineering Drawing	الرسم الهندسي	English	0		6				3	93	82	175	7.00	S	
		3	ENV114	Environmental Thermodynamics	ترموداينميك البيئة	English	2				1		3	48	52	100	4.00	S	
		5	ENV115	Statistics	الإحصاء	English	2						3	33	42	75	3.00	S	
		6	UOM101	Arabic 1	اللغة العربية 1	Arabic	2						3	33	17	50	2.00	B	
		7	UOM104	Democracy and Human Rights	الديمقراطية وحقوق الانسان	Arabic	2						3	33	17	50	2.00	B	
						Total	14	0	6	0	5	0	21	396	354	750	30.00		
														25					
	UGI	Two	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)					Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type
1			ENV121	Calculus 2	التفاضل والتكامل 2	English	3				2		3	78	72	150	6.00	S	ENV111
2			ENV122	Dynamics	ميكانيك الحركة	English	2				1		3	48	77	125	5.00	S	
3			ENV123	Principles of Environmental Engineering	مبادئ هندسة البيئة	Arabic	2	2					3	63	37	100	4.00	C	
4			ENV124	Environmental Geology	جيولوجيا البيئة	Arabic	2						3	33	42	75	3.00	S	
5			ENV125	Drawing by Computer	الرسم بواسطة الحاسوب	English			4				3	63	112	175	7.00	S	ENV113
6			UOM103	Computer	حاسوب 1	English	1		2				3	48	27	75	3.00	B	
7			UOM102	English 1	اللغة الإنكليزية 1	English	2						3	33	17	50	2.00	B	
							Total	12	2	6	0	3	0	21	366	384	750	30.00	
														23					

Course Description Form

1.Course Name:					
Calculus 1					
2.Course Code					
ENV111					
3.Semester / Year:					
Fall Semester/ 2025-2026					
4.Description Preparation Date					
1/6/2026					
5.Available Attendance Forms:					
- In classroom - Google classroom. https://classroom.google.com/c/ODI5MjIyMDczMzEx?cjc=sluxmi5n					
6.Number of Credit Hours (Total) / Number of Units (Total)					
5Hours / 6Units					
7.Course administrator's name (mention all, if more than one name)					
Name: Mayada Hazim Mohammed Email: mayada.hahm@uomosul.edu.iq					
8.Course Objectives					
Course Objectives		- Introduce students Prerequisites for calculus - Limits, and Continuity - Differentiation (methods and applications) - Matrices, Operations on matrices, and Solution of system of equations by matrix			
9.Teaching and Learning Strategies					
Strategy		Expanding students' perceptions of calculus1, familiarity with basic mathematical concepts and principles, and the ability to distinguish between different mathematical concepts. This course has several components that include studying lectures, tutorial, discussion, homework, and e-learning platforms. The course will be taught in English, and all compulsory assignments have to be submitted within the deadlines to be admitted to the exam..			
10.Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	15	Describes the basics Mathematics and focus On functions, creep and graphs	Prerequisites for calculus	In class Lectures and Tutorial. use e-classroom to post lectures and homework	Quiz, homework
4-5	10	Use different limit functions and use that to verify continuity, different types of functions	Limits and Continuity		Quiz, homework
6-8	15	There are derivatives of different types From functions using differentiation rules	Derivatives		Quiz, homework
9-12	20	Apply derivatives to find Linear approximation functins and idealism	Applications of Derivatives		Quiz, homework

13-15	15	It uses arrays and operations In solution linear equations	Matrices		Quiz, homework
11.Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc					
5 quizzes		25pts			
4 homework+ activity in class		8pts			
Report		4pts			
Onsite Assignment		3pts			
Mid Term Exam		10pts			
Final Exam		50pts			
Total		100pts			
12.Learning and Teaching Resources					
Required textbooks (curricular books, if any)			Finney, R.L,& Thomas ,G.B, "Calculus" Addison. Wesley publishing company, USA,11 th ,2011		
Main references (sources)			Anton, H., Bivens, I.C., Davis, S., Calculus: Early Transcendentals, Wiley, 10th edition, 2011.		
Recommended books and references (scientific journals, reports...)			Thomas, G. B. &Finney, R.L "Calculus and analytic geometry" Addison. Wesley publishing company, 1996		
Electronic References, Websites			https://www.sfu.ca/math-coursenotes/Math%20157%20Course%20Notes/chap Limits. https://www.cuemath.com/calculus/applications-of-derivatives/ https://tutorial.math.lamar.edu/problems calci/optimization.aspx https://byjus.com/jee/matrices/		

Course Description Form

1. Course Name:					
Statics					
2. Course Code:					
ENV112					
3. Semester / Year:					
First semester / 2025–2026					
4. Description Preparation Date:					
1/9/2025					
5. Available Attendance Forms:					
Presence (100%)/ In class					
6. Number of Credit Hours (Total) / Number of Units (Total):					
5 hours per week / 6 units					
7. Course administrator's name (mention all, if more than one name):					
Yousif hassan najim E-mail: engyousif123@yomosul.edu.iq					
8. Course Objectives:					
Course Objectives		Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. CLO-1: Makes the students able to recognize different force systems, moments and couple. CLO-2: The ability to draw Free Body Diagram and label the reactions on it. CLO-3: Makes the students able to apply equilibrium equations in statics. CLO-4: The ability to analyze different types of structures. CLO-5: The ability to determine the section properties – first and second moment of the area. CLO-6: The ability to apply friction principles.			
9. Teaching and Learning Strategies:					
Strategy		This course has several components that include lectures, individual & group assignments, Exercises. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.			
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	It defines the loads exerted on structures	Introduction, Fundamental concepts, Units of measurements,	By attending class, paying attention, participating in discussions, asking questions, completing assignments, and reading academic sources.	Daily quizzes, oral exams, homework, midterm exam, final exam
2	5	Build a freeform diagram	Scalars and Vectors, Vector Operations. The Free-Body Diagram. Coplanar Force Systems		
3	5	Build a freeform diagram	Force System Resultants		
4	5	Build a freeform diagram	Principle of Moments. Moment of a Couple		
5	5	The stability of bodies is explained by statics	Reduction of a Simple distributed Loading. Conditions for Rigid-Body Equilibrium, Free-Body Diagrams		
6	5	Analyzes internal forces	Two- and Three-Force Members. First semester midterm exam.		
7	5	Analyzes internal forces	Simple Trusses, The Method of Joints.		

8	5	Analyzes internal forces	Simple Trusses, The Method of sections.		
9	5	Analyzes internal forces	Frame analysis		
10	5	He calculates reactions	Center of gravity of a solid.		
11	5	Evaluate equilibrium	Center of gravity of composite bodies.		
12	5	Evaluate equilibrium	Definition of moment of inertia of surfaces		
13	5	Evaluate equilibrium	Moment of inertia of surfaces. Second semester midterm exam.		
14	5	Evaluate equilibrium	Moment of inertia of composite surfaces.		
15	5	Defines the loads exerted on structures	Friction. Preparatory week before the final Exam.		

Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
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There is no practical component to the course

11. Course Evaluation:

The grade out of 100 is distributed according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, and written exams, reports, etc.

First Monthly Exam (5 marks)

Second Monthly Exam (5 marks)

Daily Exams (30 marks)

Homework and Classwork (5 marks)

Class Activities and Participation (5 marks)

Final Exam (50 marks)

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Hibbeler, R.C. "ENGINEERING MECHANICS – DYNAMIC 14TH EDITION 2016" Pearson Prentice Hall
Main references (sources)	MERIAM J.L., KRAIGE L.G. , BOLTON J.N. " Engineering Mechanics Volume 1 Statics " Ninth Edition 2018 John Wiley & Sons, Inc.
Recommended books and references (scientific journals, reports...)	د.نزار جبرائيل – فخري ياسين – د. هشام العناز "الميكانيك الهندسي"

Course Description Form

1.Course Name:					
Engineering Drawing					
2.Course Code:					
ENV113					
3.Semester / Year:					
2025-2026 / Autumn semester					
4.Description Preparation Date:					
1/10/2025					
5. Available Attendance Forms:					
In class					
6. Number of Credit Hours (Total) / Number of Units (Total):					
6 hour per week/ 7 unit					
7. Course administrator's name (mention all, if more than one name):					
Name: Mohammed Husham Shukur, Email: m.h.alkafaf@uomosul.edu.iq					
Name: Ayad Abdulla Mousa, Email: ayad_engineer@uomosul.edu.iq					
8. Course Objectives:					
Course Objectives		- use the technical drawing tools properly and to plot pictures according to the dimensions and properties of technical drawing - using scale, types of scales and measurement techniques to drawings. - Increasing the student's ability to imagine - carrying out the perspective drawings due to views.			
9. Teaching and Learning Strategies:					
Strategy		This course has several components that include lectures, classwork, homework and quiz. The course will be taught in English, and all mandatory assignments have be submitted within the deadlines to be admitted to the exams.			
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Recognize engineering drawing tools and how to use them correctly, and draw shapes according to dimensions and the properties of engineering .drawing	Introduction drawing tools and how to use them, and types of fonts	using drawing tools inside the studio	
2-5	12	Uses cales, their types, and .measurement techniques	Engineering applications		
6-8	9	He applies different geometric shapes . using a compass	Projection theory and drawing projections		
9-11	9	Applies the rules of dimensions	3D drawing		
12-13	6	Implement and explains the .properties of geometric sections	Missing projections		
14-15	6	He executes perspective drawings based on different projections visualizes geometric shapes, and his .ability to do so grows	Sections drawing		

11. Course Evaluation:

homework is $8 \times 1 = 8$

Classroom assignment: $12 \times 1 = 12$

Monthly exam $2 \times 10 = 20$

Semester exam $1 \times 10 = 10$

Total = 50

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Engineering Technology	Drawing	& Graphical
Main references (sources)			
Recommended books and references (scientific journals, reports...)			
Electronic References, Websites			

Course Description Form

1. Course Name:					
Environmental Thermodynamics					
2. Course Code:					
ENV114					
3. Semester / Year:					
2025-2026					
4. Description Preparation Date:					
Oct. 2025					
5. Available Attendance Forms:					
attending					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3 per week/ 4 units					
7. Course administrator's name (mention all, if more than one name)					
Name: Maan S. Mohammed					
8. Course Objectives					
Course Objectives		1. Enable the student to know theoretical and practical concepts of the thermodynamic processes, physics materials properties and heat effect on it. 2. Enable the student to measure the temperature and pressure with conventional and modern measuring devices. 3. Enable the student to know the types of energy and practice applications. 4. Develop the fundamental principles and laws of thermodynamics and to explore the implications of these principles for system behavior including: 5. Formulate the models necessary to study. 6. Enable the student to know the types of system and their applications and how to deal with its 7. An ability to work with concepts mathematically and a functional understanding of how these ideas play out in the real world. 8. Analyze and design heat transfer systems through the application of these principles. 9. Use graphs and diagrams to convey results. develop the problem-solving skills essential to good engineering practice of heat			
9.					
Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Apply laws of conservation of energy and enthalpy to analyze energy flows in the atmosphere	Introduction, dimensions and unit. Some concepts and definitions and types of the systems.	In class Lectures and Tutorial.	Exams and homework
2	3		Measurement of pressure and temperature	In class Lectures and Tutorial.	Exams and homework
3	3		Perfect gas laws	In class Lectures and Tutorial.	Exams and homework

4	3		Solved problems sheet 1 Homework 1 & Quiz	In class Lect. and Tutorial.	Exams & homework
5	3	Calculate the energy and mass balances of environmental cycles	Forms of Energy	In class Lectures and Tutorial.	Exams and homework
6	3		Solved problems sheet 2 Homework 2 & Quiz		
7	3		Mid-term Exam		
8	3	Apply laws of conservation of energy and anthropy to analyze energy flows in the atmosphere	-Thermodynamics laws /First law of thermodynamics -Thermodynamic processes - Applied to the closed system	In class Lect. and Tutorial.	Exams & homework
9	3		Solved problems sheet 3 Homework 3 & Quiz	In class Lect. and Tutorial.	Exams & homework
10	3	Apply laws of conservation of energy and anthropy to analyze energy flows in the atmosphere	Thermodynamic processes - Applied to the open system process	In class Lectures and Tutorial.	Exams and homework
11	3		Solved problems sheet 4 Homework 4 & Quiz	In class Lect. & Tutorial.	Exams & homework
12	3	Predicts the trends of chemical reactions and distribution of pollutants in air, water, and soil	The modes of heat transfer	In class Lect. and Tutorial.	Exams & homework
13	3		Environmental application of Heat transfer	In class Lect. and Tutorial.	Exams & homework
14	3		Isothermal and non-isothermal operations	In class Lect. and Tutorial.	Exams & homework
15	3	The law of conservation of energy and the law of anthropy are applied to analyze energy flows in the atmosphere	Solved problems sheet 5 Homework 5 Quiz	In class Lect. and Tutorial.	Exams & homework
16	3	Apply laws of conservation of energy and anthropy to analyze energy flows in the atmosphere	Final Exam of the semester		

11. Course Evaluation

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, reports, etc.

- 1- Daily exams (5): 20 marks
- 2- Assignments (4): 8 marks
- 3- Reports (2): 8 marks
- 4- Semester exam (1): 10 marks
- 5- On-site Assignments (2): 4 marks
- 6- Final exam (1): 50 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Applied thermodynamics fifth edition by t.d eastop and a. mcconkey
Main references (sources)	Y. A. Çengel and M. A. Boles, Thermodynamics: Engineering Approach, 5th ed, McGraw-Hill, 2006
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Various websites concerned with the topic

Course Description Form

1. Course Name:							
Statistics							
2. Course Code:							
ENV115							
3. Semester / Year:							
First semester / 2025-2026							
4. Description Preparation Date:							
1/9/2025							
5. Available Attendance Forms:							
Presence (100%)/ In class							
6. Number of Credit Hours (Total) / Number of Units (Total):							
2 hours per week / 3 units							
7. Course administrator's name (mention all, if more than one name):							
Aaisha Muhannad , Email: aaisha.almokhtar@uomosul.edu.iq							
8. Course Objectives:							
Course Objectives		Define the procedure of data collection in a scientific way and how to describe it Describe probability distributions and its benefits in statistics Application of normal distribution in statistical tests Explain how to test claims Outline how to find the relationships between variables.					
9. Teaching and Learning Strategies:							
Strategy		Learning and teaching strategies are based on a detailed presentation of the material with examples discussion in the classroom, with the student's evaluation through short and oral exams and homework with one or more semester exams and then the final exam.					
10. Course Structure: Theoretical							
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method		
1	2	Handle and analyze large amounts of data	Introduction	By attending class, paying attention, discussing, asking, solving homework and reading scientific sources	Using daily quizzes, oral tests homework semester and final exams		
2	2		Frequency distribution				
3,4	4	Collects useful data And extracts information from it	Central tendency and variation tools				
5,6	4	Introduce probability and probability distributions	Probability principles: rules and laws				
7	2		Application of probability laws				
8,9	4		Combinatorial analysis.				
10	2	Describe the data clearly And he tests Its distribution	Normal distribution				
11,12	4		Application of Normal distribution				

13,14	2	Introduce probability and probability distributions	Hypothesis testing		
15	2	Find correlation coefficient between different variables	Correlation, Chi-square test		

Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
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There is no practical component to the course

11. Course Evaluation:

The grade out of 100 is distributed according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, and written exams, reports, etc.

First Monthly Exam (5 marks)

Second Monthly Exam (5 marks)

Daily Exams (30 marks)

Homework and Classwork (5 marks)

Class Activities and Participation (5 marks)

Final Exam (50 marks)

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Introduction to Statistics by Al-Rawi Kh.
Main references (sources)	Statistics for Sanitary Engineers by Berthouex and Brown, 2 nd ed. (2002)
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/

Course Description Form

1.Course Name:					
Arabic language 1					
2.Course Code					
UOM1011					
3.Semester / Year:					
Fall Semester/ 2025-2026					
4.Description Preparation Date					
26/10/2025					
5.Available Attendance Forms:					
In classroom					
6.Number of Credit Hours (Total) / Number of Units (Total)					
2Hours / 2Units					
7.Course administrator's name (mention all, if more than one name)					
Name: Ruqaya H. Ali					
8.Course Objectives					
Course Objectives		The purpose of the course is to introduce students to the main topics of the Arabic language course. The semester will cover the basic requirements of Arabic language definitions, grammar of tenses, the development of grammatical abilities for singular, plural, and forbidden forms of inventory, as well as rhetoric and application. At the end of the semester, students will have a broad knowledge of the concepts and this will be achieved through theoretical lectures, lessons, pit assignments, and reports related to the topics being discussed.			
9.Teaching and Learning Strategies					
Strategy		Expanding students' perceptions of the Arabic language, familiarity with the basic concepts of Arabic language and rhetoric, and the ability to distinguish between tenses. This class has many components that include the study of lectures, tutorials, discussion, homework, and e-learning platforms. The course will be taught in Arabic, and all mandatory assignments must be submitted within the exam admission deadlines			
10.Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		Introduction to the Arabic language and the definition of the Arabic language and its advantages	Lecture	Group assessment
2	2		Grammar: past tense		
3	2		Grammar: present tense		
4	2		Grammar: the five verbs		
5	2		Developing grammar: Muthanna and plural		
6	2		Developing grammar: exclamation, forbidding morphology, abstraction,		
7	2		Semester Exam	Exam	
8	2		Rhetoric and Practice: Metaphor	Lecture	Group assessment
9	2		Rhetoric and Application: Alliteration		

10	2		Rhetoric and Application: Grammar		
11	2		Rhetoric and Application: Analogy		
12	2		Spelling mistakes		
13	2		Administrative correspondence		
14-15	2		Rules and Rules of Counting and Counting		
16	2		Final Exam	Exam	

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

3 quizzes	18pts
4 homework+ activity in class	16pts
1 seminar	6pts
Mid Term Exam	10pts
Final Exam	50pts
Total	100pts

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	The Collector of Arabic Lessons / Mustafa Al-Ghalayini
Main references (sources)	Adequate grammar/ Abbas Hassan
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:					
Democracy and human rights					
2. Course Code:					
UOM1040					
3. Semester / Year:					
Fall semester / 2025-2026					
4. Description Preparation Date:					
1/9/2025					
5. Available Attendance Forms:					
Presence (100%)/ In class					
6. Number of Credit Hours (Total) / Number of Units (Total):					
2 hours per week / 2 units					
7. Course administrator's name (mention all, if more than one name):					
Nihal Abdel Wahab Hamed					
8. Course Objectives:					
Course Objectives	1. Introducing the student to the concept of human rights 2. Introducing the student to the historical development of human rights 3. Introducing the student to human rights sources 4. Introducing the student to the religious sources of human rights 5. Introducing the student to the rights and freedoms stipulated in the Iraqi constitution				
9. Teaching and Learning Strategies:					
Strategy	Learning and teaching strategies are based on a detailed presentation of the material with examples discussion in the classroom, with the student's evaluation through short and oral exams and homework with one or more semester exams and then the final exam.				
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	The concept of human rights	Define human rights and the national and procedural mechanisms for their implementation	lecture	Group assessment
2	2	The importance of human rights	,of human rights in Islamic law Type Types of human rights in the 2005 Constitution of the Republic of Iraq	lecture	
3	2	Understanding the roots of human rights	The historical development of human rights	lecture	
4	2	Knowledge of international (global and regional) sources	Human Rights in the Renaissance and the Modern Era Human Rights in Islam	lecture	
5	2	Identify the declarations and agreements regulating human rights	National and procedural human rights mechanisms	lecture	
6	2	'Developing students research and learning skills related to the subject matter	The Concept of the International Bill of Human Rights	lecture	
7	2	Midterm exam		exam	

8	2	Enhancing the student's analytical ability by training him on how to utilize the information available to him .in his studies	International Covenants of Rights of 1966		
9	2	Enhancing the student's analytical ability by training him on how to utilize the information available to him .in his studies	,The rights of women, children, minorities and persons with disabilities in international conventions	a lecture	Group assessment
10	2	Discussion of contemporary human rights issues	Rights of persons with disabilities and minorities	a lecture	Group assessment
11	2	Discussion of contemporary human rights issues	International Convention on the Elimination of All Forms of Racial Discrimination, 1965	a lecture	Group assessment
12	2	Stimulating critical thinking	National Mechanisms and Procedures for the Implementation of Private and Categorical Rights	a lecture	Group assessment
13	2	Knowing the Historical Roots of Democracy	Historical Concepts of the Origin of Democracy and Its Foundations	a lecture	Group assessment
14	2	Discussing contemporary human rights issues	The Development of Democracy in the Modern Era and its Syndromes	a lecture	Group assessment
15	2	Discussing contemporary human rights issues	Democracy in the Twentieth Century Between Totalitarianism and Global Expansion	a lecture	Group assessment
16	3	Final exam			

Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
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There is no practical component to the course

11. Course Evaluation:

The grade out of 100 is distributed according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, and written exams, reports, etc.

daily exam 3 x (6 marks) = 18

Semester Exam (10 marks)

In class homework 2 x (4 marks) = 8

Homework 2 x (4 marks) = 8

Report = 6

Total = 50

Final Exam (50 marks)

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Approach of the Ministry of Higher Education: Democracy and Human Rights
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1.Course Name:					
Calculus 2					
2.Course Code					
ENV121					
3.Semester / Year:					
Spring semester / 2025-2026					
4.Description Preparation Date					
1/6/2026					
5.Available Attendance Forms:					
- In classroom - Google classroom. https://classroom.google.com/c/ODUwMzczNDg1MTUw?cjc=qmep43kp					
6.Number of Credit Hours (Total) / Number of Units (Total)					
5 Hours / 6Units					
7.Course administrator's name (mention all, if more than one name)					
Name: Mayada Hazim Mohammed Email: mayada.hahm@uomosul.edu.iq					
8.Course Objectives					
Course Objectives		- Introduce students to the main topics of Integration. - Applications of Definite Integrals. - The Calculus of Transcendental Function. - Techniques of Integration - Polar Coordinates			
9.Teaching and Learning Strategies					
Strategy		This will be achieved through lectures, labs, individual & group assignments and e-learning platforms and tutorials. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.			
10.Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	15	Recognize indefinite integrals and definite integral and know the basic properties	Integration	In class Lectures and tutorial. use e-classroom to post lectures and homework	Quiz, homework
4-5	10	Use applications of definite integral to find areas between curves, volumes, lengths of plane curves and areas of surfaces of revolution	Applications of Definite Integrals		
6-8	15	Identified and understand of transcendental functions and know the basic properties	The Calculus of Transcendental Function		
9-12	20	Applied techniques of integration to change unfamiliar integrals into integrals we can recognize and solve	Techniques of Integration		
13-15	15	Identified the polar coordinates for drawing curves in the plane	Plane Curves and Polar Coordinates		

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

5 quizzes	25pts
4 homework+ activity in class	8pts
Report	4pts
Onsite Assignment	3pts
Mid Term Exam	10pts
Final Exam	50pts
Total	100pts

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Finney, R.L,& Thomas ,G.B, "Calculus" Addison. Wesley publishing company, USA,11 th ,2011
Main references (sources)	Anton, H., Bivens, I.C., Davis, S., Calculus: Early Transcendentals, Wiley, 10th edition, 2011.
Recommended books and references (scientific journals, reports...)	Thomas, G. B. &Finney, R.L "Calculus and analytic geometry" Addison. Wesley publishing company, 1996
Electronic References, Websites	https://math.libretexts.org/Bookshelves/Calculus/Calculus_(OpenStax)/06%3A_Applications_of_Integration#:~:text=Definite%20integrals%20can%20be%20used,as%20in%20a%20pumping%20problem. https://www.whitman.edu/mathematics/calculus_online/chapter09.html https://www.khanacademy.org/math/calculus-a-old/integration-techniques-calc

Course Description Form

1. Course Name:					
Dynamics					
2. Course Code:					
ENV122					
3. Semester / Year:					
Spring semester / 2025-2026					
4. Description Preparation Date:					
1/9/2025					
5. Available Attendance Forms:					
My presence (100%)/ In class					
6. Number of Credit Hours (Total) / Number of Units (Total):					
4 hours per week / 5 units					
7. Course administrator's name (mention all, if more than one name):					
Yousif Hassan Najim					
8. Course Objectives:					
Course Objectives		CLO#1: To define and explain principles of engineering mechanics (dynamics) related to experimental engineering domain. CLO#2: The ability to draw Free Body Diagram and label the reactions on it CLO#3: To solve problems of dynamics using principles of engineering mechanics. CLO#4: To discuss and clarify concepts of principles of engineering mechanics (dynamics) for different simple situations. CLO#5: To prepare free body diagrams of real case phenomenon considering engineering mechanics point of view. CLO#6: To understand Newton's law in motion and recognize different kinds of particle motions. CLO#7: To understand the principle of Newton's second law, work, power, and efficiency. CLO#8: To understand the principle of Linear Impulse and Momentum for a System of Particles, and the concept of a conservative force. CLO#9: Application of principles of work-Energy and Impulse-momentum in the dynamic analysis. CLO#10: An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. CLO#11: An ability to acquire and apply new knowledge and using appropriate learning strategies. CLO#12: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams.			
9. Teaching and Learning Strategies:					
Strategy		This course has several components that include lectures, individual & group assignments, Exercises. course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.			
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Define the rigid body	Introduction to concepts of position,	By attending class, paying attention, participating in discussions, asking questions,	Daily quizzes, oral exams, homework, midterm exam, final exam
2	4	Applying vector laws	Vector Operations: Algebra and Computations and Vector Calculus—Velocity and Acceleration.		
3	4		Newtonian Mechanics: Newton's Laws, Systems of Units, and Energy and Momentum		
4	4		Rectilinear Kinematics: Curvilinear Motion:		

5	4		Rectangular Cartesian Coordinates Curvilinear Coordinates:	completing assignments, and reading academic sources.	
6	4		Motion of a Projectile and Absolute Dependent Motion Analysis of Two Particles.		
7	4		Coordinate Transformations: Rotation Transformations, and Rotation Sequences		
8	4		Displacement, Time Derivatives: Angular Velocity and Acceleration, and Analytical Description.		
9	4	Analyze speed acceleration, and .displacement	Velocity and Acceleration Analysis Using a Moving Reference Frame.		
10	4		Observations from a Moving Reference Frame.		
11	4		Newton's Second Law of Motion and Equation of Motion: Rectangular Coordinates		
12	4	Distinguish between the description of motion and the .energy of motion	Investigate central-force motion and apply it to problems in space mechanics.		
13	4		The principle of work and energy, and Power and Efficiency		
14	4	Calculates the total momentum of the body	Principle of Linear Impulse and Momentum for a System of Particles, and the concept of a conservative force.		
15	4		Theorem of conservation of energy to solve kinetic problems, and Friction Forces and Spring Forces.		

Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
There is no practical component to the course					

11. Course Evaluation:

The grade out of 100 is distributed according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, and written exams, reports, etc.

First Monthly Exam (5 marks)

Second Monthly Exam (5 marks)

Daily Exams (30 marks)

Homework and Classwork (5 marks)

Class Activities and Participation (5 marks)

Final Exam (50 marks)

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Hibbeler, R.C. " ENGINEERING MECHANICS – DYNAMICS 14TH EDITION 2016" Pearson Prentice Hall
Main references (sources)	MERIAM J.L., KRAIGE L.G., BOLTON J.N. " Engineering Mechanics Volume 2 Dynamics " Ninth Edition 2018 John Wiley & Sons, Inc.
Recommended books and references (scientific journals, reports...)	د.نزار جبرائيل - فخري ياسين - د.هشام العناز " الميكانيك الهندسي
Electronic References, Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering/dept/

Course Description Form

1. Course Name:					
Principles of Environmental Engineering					
2. Course Code:					
ENV123					
3. Semester / Year:					
Spring Semester/2025-2026					
4. Description Preparation Date:					
1/1/2026					
5. Available Attendance Forms:					
Inside the class, online https://classroom.google.com/c/ODUxNTk5NDI3OTUx?cjc=mbsa4ne2					
6. Number of Credit Hours (Total) / Number of Units (Total)					
4 hours/week /6units					
7. Course administrator's name (mention all, if more than one name)					
Name: Hanan Haqi Ismail Thura Azzam Abed Email: hanan.eng2014@uomosul.edu.iq thura.azzam@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		- During this course, the student learns about the tasks of an environmental engineer, as well as distinguishing between the most common types of pollution in the surrounding environment. - Study the quality of water and solid waste. - Briefly study drinking water units and wastewater treatment plants. - Identify noise, air, thermal and radiation pollution, which will be expanded upon in the stages of the study.			
9. Teaching and Learning Strategies					
Strategy		The strategy is achieved through lectures, e-learning platforms, and giving home and class assignments			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Assesses the environment, surrounding factors, types of pollution, and how to engineer them	Introduction. What's the environmental engineering.	PowerPoint lecture	exam
2	4	Identify the most important surface water pollutants and their requirements Biochemical oxygen.	Water quality. Surface water pollution and its sources,	PowerPoint lecture	exam
3	4	Identify the phenomenon of food enrichment in lakes and the phenomenon of thermal application	Water quality in lakes. Lakes characteristics, the Eutrophication	PowerPoint lecture	exam
4-7	4	Identify the units of both drinking water treatment plants and wastewater treatment plants	Water treatment, water requirement: Water consumption	PowerPoint lecture	Exam and Homework

8-9	8	Knowledge of the sources and characteristics of solidwaste, methods of disposal solid waste.	Solid Waste. Sources and characteristics of Solid Waste, Solid Waste disposal methods.	PowerPoint lecture	exam
10	4	Identify noise pollution, its harms, and ways to combat it.	Noise pollution, noise meter, calculation of noise from different sources.	PowerPoint lecture	exam
11-13	12	Identify the most common types of pollution in the environment, such as air pollution.	Air pollution, sources of air pollution, practical removal methods.	PowerPoint lecture	exam
14	4	Identify thermal pollution, its sources, and ways to reduce its impact on Waterbodies.	thermal pollution: Sources of the thermal pollution.	PowerPoint lecture	exam
15	4	Identify radioactive contamination and ways to prevent it.	Radioactive pollution.	discussion	a report

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

quizzes	10
H.W	10
c.w	10
report	5
Educational Visit	5
term Exam	10
Final Exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Tariq Ahmed Mahmoud “Environmental Technology”, 1988. Metcalf and Eddy "Wastewater engineering, treatment and resource recovery", McGraw hill, New York, 2014.
Main references (sources)	Abdul Hadi Yahya Al-Sayegh and Arwa Shazal, “Environmental Pollution” Energy, 2002.
Recommended books and references (scientific journals, reports...)	Al-Rafidain Engineering Journal
Electronic References, Websites	Environmental engineering 4enveng.com

Course Description Form

1. Course Name:					
Geology					
2. Course Code:					
ENV124					
3. Semester / Year:					
Spring/ 2025-2026					
4. Description Preparation Date:					
February 2025					
5. Available Attendance Forms:					
Class attendance, laboratory					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2 hr. in week/ 3 units					
7. Course administrator's name (mention all, if more than one name)					
Name: Dr Mohammed Thafer Abdulnafaa Email: mohammed1979eng@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		• This course aims to introduce the students to the category of Environmental Geology. Geology –is the study of the earth, its materials and their properties, its internal and external physical, chemical, and biological properties, and its history. Environment – anything, living or nonliving, that surrounds and influences living organisms. Environmental Geology • the application of geology to environmental concerns. This will be achieved through descriptive lectures			
9. Teaching and Learning Strategies					
Strategy		This course has several components that include lectures, individual or group assignments, rock lab visits, and e-learning platforms. The course will be taught in Arabic and English, and all mandatory reports have to be submitted within the deadlines.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	He knows the principles of geology, especially the materials and composition of the earth	Introduction,	Lecture	Exam
2	2		Historical geology	Lecture	Exam
3	2		Composition /formation of the earth's crust	Lecture	Exam
4	2	Differentiates between different types of rocks and soils	Structural geology, rocks (part1)	Lecture	Exam
5	2		Structural geology, rocks (part2)	Lecture	Exam
6	2		Geology of water supply, (part1) Surface Water	Lecture	Exam
7	2		Geology of water supply, (part2) Ground Water	Lecture	Exam

8	2	Differentiates between different types of rocks and soils	Geology of dams and reservoirs (part1)	Lecture	Exam
9	2		Geology of dams and reservoirs (part2)	Lecture	Exam
10	2		Geology of building materials (part1)	Lecture	Exam
11	2		Geology of building materials (part2)	Lecture	Exam
12	2		Topographical and geological maps (part1)	Lecture	Exam
13	2		Topographical and geological maps)part 2(	Lecture	Exam
14	2		Environmental geology: special subjects))art 1(	Lecture	Exam
15	2		Environmental geology: special subjects)part 2(	Lecture	Exam

11. Course Evaluation

term Exam (1): 15pt
term Exam (2): 15pt
report: 10pt
Midterm:10 pt
Final exam: 50pt

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	1. Ghazi Atia Zarraq, Dr.Lafta Salman Kadhim, Dr Mahmood Fadhil Abid, " Environmental Geology ", Iraq, 2016
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Courses from the internet

Course Description Form

1. Course Name:					
Drawing by Computer					
2. Course Code:					
ENV125					
3. Semester / Year:					
spring semester / 2025–2026					
4. Description Preparation Date:					
1/3/2026					
5. Available Attendance Forms:					
attending					
6. Number of Credit Hours (Total) / Number of Units (Total):					
4 hour/ 7 unit					
7. Course administrator's name (mention all, if more than one name):					
Name: Mohammed Husham Shukur Email: m.h.alkafaf@uomosul.edu.iq					
Name: Ayad Abdulla Mousa Email: ayad_engineer@uomosul.edu.iq					
8. Course Objectives:					
Course Objectives		This course contains comprehensive training in AutoCAD. It incorporates the features, commands, and techniques for creating, editing, and printing 2D drawings with AutoCAD LT.			
9. Teaching and Learning Strategies:					
Strategy		This course has several components that include lectures, classwork, homework and quiz. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.			
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Course Structure: Experimental					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	He familiarizes himself with the AutoCAD program interface	Getting started: 1- Start a new drawing. 2- User Interface. 3- Drafting settings 4- Limits. 5- Units. 6- Absolute & Relative coordinate system. 7- Ortho.	Computer-aided drawing inside a computer lab	

2-3	4	Learn the basic concepts and main features of AutoCAD software	Drawing I 1- 2- Line, Arc, Circle, Ellipse, Polygon, Rectangle,		
4	2	Use the precise drawing tools in AutoCAD to prepare accurate engineering .drawings	Drawing II, View. 1- Zoom, Pan, 2- Drafting settings 3- Pline, Pedit. 4- Erase. 5- Selecting objects. 6- Type, Scale.		
5	2		Modify I, Drawing III: 1-Copy, Rotate, Move, Scale, Stretch. 2- Undo, U, Redo. 3-,		
6-7	4		Layers, Modify II: 1- Working with Layers. 2- Properties (Mo, Ch). 4- Working with Grips.		
8-9	4	Design drawings in a detailed and distinctive .geometric style	Modify III. 1- Array, Offset, Fillet, Chamfer, Trim, Extend, Lengthen, Mirror, Break, Join, Explode.		
10-11	4		Annotation I, Modify IV, Inquiry: 1-Style, Text, Mtext, Dedit, 2- ID, Dist, Area, Mass prop		
12-13	4		Annotation II: 1- Dimensions & Leaders.		
14	2	It develops the student's ability to visualize geometric .patterns	Hatch, Hatched it..		
15	2		Block I: 1- Block, Insert. 2- Block. 3- Image, Draworder. 4-plot		

11. Course Evaluation:

My homework is $8 * 1 = 8$

:Classroom assignment $12 * 1 = 12$

Monthly exam $2 * 10 = 20$

Semester exam $1 * 10 = 10$

Total = 50

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Autodesk AutoCAD 2018 online Help
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:					
Computer 1					
2. Course Code:					
UOM 1031					
3. Semester / Year:					
2/ 2026					
4. Description Preparation Date:					
2026					
5. Available Attendance Forms:					
In-person					
6. Number of Credit Hours (Total) / Number of Units (Total):					
1 Theoretical Hours + 2 Practical Hours /3 Credits					
7. Course administrator's name (mention all, if more than one name):					
Ahmed Yaseen Shehab					
8. Course Objectives:					
Course Objectives		Preparing students to deal with computer systems, learn computer fundamentals and components, and use Microsoft Office applications (Word, Excel, and PowerPoint).			
9. Teaching and Learning Strategies:					
Strategy		Practical and Applied Learning Strategy: - Direct use of computers during class. - Students practice software applications independently			
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Edit documents using Microsoft Word with the application of formatting and printing tools	Computers and Operating Systems	In person	Class/Home Assignments
2	2		Computers and Operating Systems (Cont.)	In person	
3	2		Hardware and Software Interaction	In person	
4	2		Hardware and Software Interaction (Cont.)	In person	
5	2		Windows File Management	In person	
6	2		Computer Hardware Components	In person	
7	2		Computer Hardware Components (Cont.)	In person	
8	2		Midterm Exam	In person	Written Exam
9	2	Edit documents using Microsoft Word with the application of formatting and printing tools	Microsoft Office	In person	Class/Home Assignments
10	2		Introduction to Word	In person	
11	2		Document Editing and Formatting	In person	
12	2	Create Spreadsheets using Microsoft Excel Performing calculations and using basic functions	Introduction to Excel	In person	Class/Home Assignments
13	2		Organizing and Enhancing Worksheets	In person	
14	2		Creating Formulas and Charts	In person	

15	2	He designs professional presentations using Microsoft PowerPoint, Inserting images, tables and multimedia	Microsoft PowerPoint	In person	Class/Home Assignments
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Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Edit and format documents with Microsoft Word with the Formatting & Print Tools app Prepare electronic spreadsheets using Microsoft Excel, perform calculations, and use basic functions. He designs professional presentations using Microsoft PowerPoint and inserting images, tables, and multimedia	Computers and Operating Systems	In-person using a computer	Computer Lab Application / Assignments
2	2		Computers and Operating Systems (Cont.)		
3	2		Hardware and Software Interaction		
4	2		Hardware and Software Interaction (Cont.)		
5	2		Windows File Management		
6	2		Computer Hardware Components		
7	2		Computer Hardware Components (Cont.)		
8	2		Midterm Exam		
9	2		Microsoft Office		
10	2		Introduction to Word		
11	2		Document Editing and Formatting		
12	2		Introduction to Excel		
13	2		Organizing and Enhancing Worksheets		
14	2		Creating Formulas and Charts		
15	2		Microsoft PowerPoint		

11. Course Evaluation:

Assignments	No.	Degree
Class Assignments	2	%10
Home Assignments	3	%10
Practical Exams	2	%20
Midterm Exam	1	%10
Final Exam	1	%50
Total degree		%100

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	
Main references (sources)	Computer Literacy BASICS: A Comprehensive Guide to IC3
Recommended books and references (scientific journals, reports...)	IC3 GS5 Certification Guide Using Windows 10 & Office 201
Electronic References, Websites	

Course Description Form

1. Course Name:					
English 1					
2. Course Code:					
UOM1021					
3. Semester / Year:					
Spring/ 2025-2026					
4. Description Preparation Date:					
2/6/2026					
5. Available Attendance Forms:					
Presence in the class					
6. Number of Credit Hours (Total) / Number of Units (Total):					
Two Hours Per Week/ 2 unit					
7. Course administrator's name (mention all, if more than one name):					
A.L. Muhammad Maan Mamdouh					
8. Course Objectives:					
Course Objectives		- Introducing the student to the English language curriculum. - English grammar explanation.			
9. Teaching and Learning Strategies:					
Strategy		Lecture, Dialogue & Discussion, and Brainstorming.			
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-15	30	Uses engineering and environmental terms A laboratory or research report is drafted following the correct academic structure It uses different tenses such as present tense and past simple	English	Using data show in the lecture and adopting the traditional method of using a whiteboard.	Daily exam, monthly exam, and homework.
Course Structure: Experimental ... Nothing					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
11. Course Evaluation:					
The grade is out of 100, (50 for the final exam) and (50 for coursework), which is divided into 10 points for the midterm exam and 40 points distributed between the daily quiz, homework, and other activities.					

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Nothing
Main references (sources)	English Grammar in Use
Recommended books and references (scientific journals, reports...)	Nothing
Electronic References, Websites	Nothing

Course Description
Environmental Engineering
Department
College of Engineering
University of Mosul
Second Year / Bologna Process

2nd Level

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
UGII	Three	1	ENV211	Mathematics	الرياضيات	English	3				2		3	78	72	150	6.00	S	ENV121
		2	ENV212	Fluids Mechanics	ميكانيك الموائع	English	2		2		1		3	78	57	125	5.00	C	
		3	ENV213	Chemistry	الكيمياء	English	2		2				3	63	37	100	4.00	S	
		4	ENV214	Engineering Surveying	المساحة الهندسية	English	2		3				3	78	22	100	4.00	S	
		5	ENV215	Strength of Materials	مقاومة المواد	English	2				1		3	48	52	100	4.00	S	
		6	ENV216	Engineering Hydrology	علم المياه	English	2						3	33	42	75	3.00	S	
		7	UOM2050	Crimes of Baath Party in Iraq	جرائم حزب البعث في العراق	Arabic	2						3	33	17	50	2.00	B	
		8	UOM2022	English 2	اللغة الانكليزية 2	English	2						3	33	17	50	2.00	B	
						Total	17	0	7	0	4	0	24	444	306	750	30.00		
	Four	1	ENV221	Water Quality Engineering	هندسة نوعية المياه	English	3		2				3	78	97	175	7.00	C	
		4	ENV222	Concrete and Building Technology	تكنولوجيا الخرسانة والبناء	English	3		2				3	78	72	150	6.00	S	
		3	ENV223	Survey Applications and GIS	تطبيقات المساحة ونظم المعلومات الجغرافية	English	2		3				3	78	72	150	6.00	S	
		4	ENV224	Microbiology	أحياء مجهرية	English	2		2				3	63	87	150.00	6.00	S	
		5	UOM2012	Arabic 2	اللغة العربية 2	English	2						3	33	17	50	2.00	B	
		6	UOM2023	Computer 2	حاسوب 2	English	2		2				3	63	12	75	3.00	S	
						Total	14	0	11	0	0	0	18	393	357	750	30.00		
														25					

Course Description Form

1. Course Name:					
Mathematics					
2. Course Code:					
ENV211					
3. Semester / Year:					
Fall Semester/ 2025-2026					
4. Description Preparation Date:					
1/6/2026					
5. Available Attendance Forms:					
- In classroom - Google classroom. https://classroom.google.com/c/ODA5NzAzNjg2NTk0?cjc=5edhogj4					
6. Number of Credit Hours (Total) / Number of Units (Total):					
5 hours/6 units					
7. Course administrator's name (mention all, if more than one name)					
Name: Salim Yousif Awad Email: sua@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		This course provides students with the fundamentals for the following topics: - plane analytic geometry (Circle, parabola, Ellipse, Hyperbola). - partial derivatives for Functions of two or more variables. - Hyperbolic function. - Multiple Integration. - Differential equations (1st order 1st degree).			
9. Teaching and Learning Strategies					
Strategy		This course has several components that include studying lectures, tutorial, discussion, homework, and e-learning platforms. The course will be taught in English, and all compulsory assignments have to be submitted within the deadlines to be admitted to the exam.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	- Define the basics of mathematics - Finds the error in the dimensions	plane analytic geometry	- In-class lectures & tutorial - Use e-classroom to post lectures & homework's	Quizzes
2-5	20	Uses Partial Derivatives	Partial derivative		Quizzes, homework
6-8	15	Applies the hyperbolic function	Hyperbolic function identities		Quizzes, homework
9-12	20	Calculates area, volume, mass, center of gravity	Multiple Integration		Quizzes, homework
13-15	15	Recognizes the configuration and solution of normal calculus	Differential Equations (D.E)		Quizzes, homework

11. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc	
5 quizzes	25pts
4 homework+ activity in class	8pts
Report	4pts
Onsite Assignment	3pts
Mid Term Exam	10pts
Final Exam	50pts
Total	100pts
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Finney, R.L,& Thomas ,G.B, "Calculus" Addison. Wesley publishing company, USA,11 th ,2011
Main references (sources)	Anton, H., Bivens, I.C., Davis, S., Calculus: Early Transcendentals ,Wiley, 10th edition, 2011.
Recommended books and references (scientific journals, reports...)	Thomas ,G. B. &Finney ,R.L "Calculus and analytic geometry" Addison. Wesley publishing company, 1996.
Electronic References, Websites	https://www.sfu.ca/math-coursenotes/Math%20158%20Course%20Notes/book1.html https://www.google.iq/books/edition/Advanced_Calculus_of_Several_Variables/6eq-DwAAQBAJ?hl=en&gbpv=1&dq=calculus+of+function+f+several+variables+pdf&printsec=frontcover https://youtu.be/5-CUqogfPLY

Course Description Form

1. Course Name:					
Fluid Mechanics					
2. Course Code:					
ENV212					
3. Semester / Year:					
Fall Semester/2025-2026					
4. Description Preparation Date:					
1/9/2025					
5. Available Attendance Forms:					
Inside the class, online https://classroom.google.com/c/ODA5NzYyMzAzOTky?cjc=wsnvghx2					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3 theoretical +2 lab (125)/ 5					
7. Course administrator's name (mention all, if more than one name)					
Name: Thura Azzam Abed Email: thura.azzam@uomosul.edu.iq					
8. Course Objectives					
Course Objectives	On successful completion of this course students will be able to: 1-Defining the formulas that give the main parameters of fluids (i). 2-Formulate the main equations that cover the fundamentals of concern fields (i). 3-Appling the formulas and equations to solve different problems in various fields to give the results that can be used in different sides of engineering (ii). 4-Correlating the theoretical principles with practical by carrying out laboratory experiments with analysis of results and discussion (iii).				
9. Teaching and Learning Strategies					
Strategy	This course has several components that include lectures, individual & assignments, e-learning platforms. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	6	Enumerates mathematical formulas that give the main criteria for fluid properties	Fluids properties, Fluid statics: Pressure in fluid; Types of pressure; Pressure measuring devices.	lectures, individual & assignments, and e-learning platforms	Quizzes (term + Final) exams
3-4	6		Pressure force on submerged plane surface; Pressure force on submerged curved surface.		
5-6	6	Define of the basic laws governing the behavior of fluids in the states of rest and motion	Fluid Kinematics: Flow patterns; Continuity equation and its applications		
7-9	9	Applies basic equations that cover key principles in relevant fields	Bernoulli's equation and its applications		
10-11	6	Formulas and equations are used to solve various	Momentum equation and its applications		

12-14	9	problems in different fields to produce results that are applicable in multiple engineering aspects	Flow of real fluid in pipe, friction loss, types of problems, minor losses		
15	3		Pipes in series and parallel		

Lab. Syllabus

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	Conducting laboratory experiments to link the theoretical aspect with the practical aspect while analyzing and discussing the results	Determine the force exerted on submerged plane surface	laboratory experiment	Report + (term +final) exams
3-4	4		Determine the friction factor in pipe		
5-6	4		Prove the Bernoulli equation		
7-8	4		Determine the Reynold number		
9-10	4		Calculate the discharge in pipe using orifice meter		
11-12	4		Calculate the discharge in pipe using Venturi meter		
13-14	4		Determine the force exerted by water jet on plane and curved surface		
15	2		Calculate the discharge in open channels		

11. Course Evaluation

Quizzes (3)	18 %
H.w (5)	5 %
C.w (2)	2%
Midterm exam	10%
Fluid lab. Term Exam	7 %
Fluid lab. Reports (8)	8 %
Fluid lab. Final Exam	10 %
Final Exam	50%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Esposito, A., 1998, Fluid Mechanics with applications, Prentice Hall, Inc.
Recommended books and references (scientific journals, reports...)	1.White, F. M., 1994, Fluid Mechanics, 3 rd ed., McGraw Hill, Inc. 2. Cengel Y. and Cimbala J., 2014, Fluid Mechanics Fundamentals and Applications, 4th edition, McGraw Hill.
Electronic References, Websites	

Course Description Form

1. Course Name:					
Chemistry					
2. Course Code:					
ENV213					
3. Semester / Year:					
Fall/ 2025-2026					
4. Description Preparation Date:					
June, 7, 2026					
5. Available Attendance Forms:					
In-person lectures					
6. Number of Credit Hours (Total) / Number of Units (Total):					
4 hrs. /4 units					
7. Course administrator's name (mention all, if more than one name):					
Waad Mohammed Ali Abbas / waadd1976@uomosul.edu.iq					
8. Course Objectives:					
1. Understand the fundamental concepts and applications of the Chemistry. 2. Explain the chemical processes occurring in air, water, and soil systems. 3. Analyze the environmental fate, transport, and distribution of anthropogenic chemicals in the environment. 4. Predict the reactions, partitioning behavior, and concentrations of pollutants in different environmental compartments. 5. Evaluate the impacts of environmental pollutants on human health, ecosystems, and natural resources. 6. Apply principles of sustainable engineering approaches to mitigate environmental pollution and its adverse effects.					
9. Teaching and Learning Strategies:					
Strategy		This course includes several topics such as lectures, individual and group assignments, field visits, and e-learning platforms. The subject is taught in English, and all mandatory assignments must be submitted by the deadlines to be accepted for the exams. Basic laboratory work supports the lecture topics			
10. Course Structure: Theoretical					
Week	Hou rs	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Defines the basic concepts in chemistry, environmental chemistry and their engineering applications	Introduction to Chemistry and Basic Chemical Concepts	in-person	Quiz
2	2	Explains the chemical reactions and processes affecting water, air, and soil quality	Chemical Reactions and Stoichiometry	homework	Exercises' solving
3	2		Acid Base Reactions	in-person	Quiz
4	2		Oxidation-Reduction Reactions	homework	Exercises' solving
5	2	Analyzes the chemical properties of pollutants and their impact on the environment and public health	Reactions Involving gases	homework	Exercises' solving
6	2		Common Ion Effect	homework	
7	2		Equilibrium Among Gases and Liquid	homework	
8	2	All above outcomes	Lectures from 1 to 7	in-person	Mid-term
9	2	Assesses sources of chemical contamination and suggests appropriate treatment and control methods	Reactions Kinetics	homework	Exercises' solving
10	2		Gas Transfer Across Air – water Interfaces	in-person	Quiz

11	2	Assesses sources of chemical contamination and suggests appropriate treatment and control methods	Organic Chemistry	homework	Exercises' solving
12	2		Water Chemistry	in-person	Quiz
13	2		Buffers	homework	Exercises' solving
14	2		Soil Chemistry and Atmospheric Chemistry	homework	
15	2	Student understand all topics of chemistry related to environment	All topics	in-person	Final exam

Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	- Conducts laboratory chemical tests and analyses using standard instruments and methods - Calculates chemical concentrations and parameters and applies chemical equations to solve environmental problems	Laboratory Safety	homework	reporting
2	2		Water and Solutions	homework	reporting
3	2		Titration	homework	reporting
4	2		Determination of Water Alkalinity	homework	reporting
5	2		All above topics	in-person	Quiz
6	2		Chlorides	homework	reporting
7	2		pH (Hydrogen Ion Concentration)	homework	reporting
8	2		Analytical Methods	homework	reporting
9	2		All topics	in-person	Mid-term
10	2		All topics	in-person	Final exam

11. Course Evaluation:

Homework: $5 \times 2 = 10$

Quiz: $5 \times 2 = 10$

Lab reports: $10 \times 1 = 10$

Lab exam: $1 \times 10 = 10$

Mid-term exam 10

Final Examination 50

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Practical engineering for water tests
Main references (sources)	Principles of Environmental Engineering and Science by Susan J. Masten and Mackenzie L. Davis, and Standard tests for water and wastewater
Recommended books and references (scientific journals, reports...)	Chemistry for Environmental Engineering by Clair N. Sawyer, and all related practical chemistry analysis
Electronic References, Websites	All environmental and practical chemistry Websites

Course Description Form

1. Course Name:					
Engineering Surveying					
2. Course Code:					
ENV214					
3. Semester / Year:					
Fall semester / 2025-2026					
4. Description Preparation Date:					
March 2025					
5. Available Attendance Forms:					
In class attending					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3/ week theory + 3 lab. /4 units					
7. Course administrator's name (mention all, if more than one name)					
Name: Dr. Mohammed T. Abdulnafaa, Email: mohammed1979eng@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		This course aims to introduce the student to the engineering surveying category. Introductions and definitions used in plane surveying: Instruments for measuring distance obstacles in measurements Instruments for determining right angles, tape corrections. Leveling, areas and volumes. Quantity calculation. Surveying using theodolite and traverse. Measuring rotational speed. Curves. Universal Instrument Station, GPS Field Procedure. This will be achieved through descriptive lectures			
9. Teaching and Learning Strategies					
Strate	CLO-1: Students will be able to define and differentiate the basics of measurement. (i) CLO-2: After carrying out the design, analysis and synthesis processes, the student can make a preliminary design of some method issues (ii) CLO-3: The student will be able to perform some survey tests and measurements such as heights and coordinates using various devices. (iii) CLO-4: Students will be able to make appropriate judgments in engineering situations related to surveying problems such as road construction. (v) CLO-5: Processing of data obtained from selective survey topics presented and organized during the course (iv) CLO-6: Form some opinions on emerging environmental issues and try to give some solutions compatible with the problems related to cadastral aspects (vii)				
10. Course Structure					
Wee k	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Measures distances and discerns the basics of measurement	Basic Definitions, Types of Surveying, Units, and conversions	E-learning and in-person education	Exams and homework
2	3		Linear measurements,		
3	3		Tape measurements, and		
4	3		Tape measurements and corrections		
5	3	Applies the principles of contouring line to topographic mapping	Leveling definitions and instruments		
6	3		Leveling methods and leveling device		
7	3		Longitudinal and cross sections		
8	3		Contour lines		
9	3		Contour lines		
10	3	Conducts some tests and surveys such as elevations	Theodolite		
11	3		Angles, directions		
12	3		Coordinates		

13	3	and coordinates using various instruments	Integrated station device		
14	3		Principles of positioning system		
15	3		Vertical curves		
16	3		Preparing week for final exam		

The Practical Side

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Measures distances and discerns the basics of measurement	Measure the area with tape and guide	in-person education	Practical report and exam
2	3		Making right angles in different ways		
3	3		Projecting the boundaries of a building using a tape measure		
4	3		Projecting building boundaries using the polygon method		
5	3	Applies the principles of contouring line to topographic mapping	Installing the leveling device		
6	3		Leveling the ground using a leveling device		
7	3		Leveling the ground using a leveling device		
8	3		Longitudinal sections and cross sections		
9	3		Longitudinal sections and cross sections		
10	3	Conduct some tests and surveys such as elevations and coordinates using different devices	Installation and installation of the theodolite device		
11	3		Projecting building dimensions using a theodolite device		
12	3		Projecting building dimensions using a theodolite device		
13	3		Installation and installation of the Total Station device		
14	3		Using the quick functions on the Total Station		
15	3		Using the quick functions on the Total Station		
16	3		Practical exam		

11.Course Evaluation

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily oral, monthly written exams, reports, etc.

- 1- Daily exams (3): 20 marks
- 2- Assignments (1): 5 marks
- 3- Reports and practical exam (1): 15 marks
- 4- Semester exam (1): 10 marks
- 5- Final exam (1): 50 marks

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	B. Kavannagh. "Surveying with Construction Applications", 6th edition
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	Various websites concerned with the topic

Course Description Form

1. Course Name:					
Strength of materials					
2. Course Code:					
ENV215					
3. Semester / Year:					
First /2025-2026					
4. Description Preparation Date:					
2/9/2025					
5. Available Attendance Forms:					
face-to-face at classroom setting					
6. Number of Credit Hours (Total) / Number of Units (Total):					
3 per week/ 4 units					
7. Course administrator's name (mention all, if more than one name):					
Name: Rana Burhan Abdullrahman Email: rn.burha@uomosul.edu.iq					
8. Course Objectives:					
Course Objectives	-To introduce students to the effects of external loads on structural members and to understand the behavior of materials and structures under loading. -To explain the different types of stress and strain, the relationships between them, and the methods used for their analysis and calculation. -To develop students' ability to analyze and calculate stresses in thin-walled pressure vessels and understand their engineering applications. -To enhance students' skills in constructing and interpreting shear force and bending moment diagrams for structural members. -To enable students to calculate bending and shear stresses in beams and evaluate their performance under applied loads. -To provide students with the knowledge and techniques required to determine beam deflections and analyze the effects of different loading conditions on structural behavior.				
9. Teaching and Learning Strategies:					
Strategy	This is an active, blended learning course that will require student to be engaged through the google classroom platform. This course is designed to stimulate learning through participation of students consider key questions that need to be answered to understand given topic				
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Defines the different types of stresses and explains the relationship between them and the methods of calculating them in the different structural elements	Introduction to Strength of Materials	blend of online learning lectures with face-to-face instructions/ discussions of lectures.	Quiz & H. W
2-4	9		Simple Stresses (Normal Stress, Shear Stress, Bearing Stress)		
5	3	Explains the relationship between stress and stress and calculates	Thin Walled Cylinders (Pressure Vessels)		

		their values for elements exposed to different loads			
6-8	9	Applies basic mechanics principles to evaluate the appropriate dimensions of structural elements without exceeding the limits of allowable stress and strain	Strain, Statically Indeterminate Problems	blend of online learning lectures with face-to-face instructions/ discussions of lectures.	Quiz & H. W
9-11	9	Analyzes the behavior of supports and sills exposed to different loads by drawing shear and torque diagrams and understanding the assumptions and constraints of theories used in materials mechanics	Shear and Moment in Beams (Introduction, Supports and Load, Shear-Moment Equations, Area method for Drawing Shear and Moment Diagram)		
13-12	6	According to the maximum shear and torque values, it uses the theories of material mechanics to determine the bending and shear stresses of different structural elements	Stresses in Beams (Shear and Flexural Stresses in Beams)		
14-15	6	Formulates deviation equations and evaluates deviation values for thresholds exposed to different types of loads	Beam Deflections (Double Integration Method)		

11. Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

12. Course Evaluation:

5 Home work: 5 pts
 5 Quizzes: 30 pts
 Report: 5 pts
 Mid exam: 10 pts
 Final exam: 50 pts

13. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	F. L. Singer and A. Pytel, Strength of materials, 3ed edition, 1980.
Main references (sources)	Pytel and J. Kiusalaas, Mechanics of materials, 2nd edition, 2012, Library of Congress.
Recommended books and references (scientific journals, reports...)	S. Ramachandran, V.J. George, R. Venkatasubramani and A. Vennila, Strength of materials (Mechanics of Solids), 6th edition, 2017, ISBN: 978-81- 924031-4-4. • K.S. Yadav, Strength of materials, 2nd edition, 2018, ISBN: 978-81-89401-50-4.
Electronic References, Websites	https://mechanicalc.com/reference/strength-of-materials https://www.theopeneuducator.com/strength-of-materials https://www.youtube.com/watch?v=W5cviLowZ1U

Course Description Form

1. Course Name:					
Engineering Hydrology					
2. Course Code:					
ENV216					
3. Semester / Year:					
Fall semester / 2025-2026					
4. Description Preparation Date:					
2025/9/1					
5. Available Attendance Forms:					
In class presence (100%)					
6. Number of Credit Hours (Total) / Number of Units (Total):					
2 hours per week / 3 units					
7. Course administrator's name (mention all, if more than one name):					
Aisha Muhannad , Email: aaisha.almokhtar@uomosul.edu.iq					
8. Course Objectives:					
Course Objectives	- To introduce students to the principles of hydrology and its related topics, building a solid scientific foundation. - To address environmental risks related to water, floods, water quality, and future human settlements, aiming to achieve environmental and engineering balances and sustainability.				
9. Teaching and Learning Strategies:					
Strategy	The course includes a detailed presentation of the material through thorough explanations, examples, classroom discussions. Student assessment is conducted through interactive lectures, discussions during the lectures, and the completion of examples and assignments encourage critical thinking and direct application. The study of engineering hydrology encompasses multiple topics, and focusing on balancing these topics is crucial for building a solid scientific foundation for engineering students in general, and environmental engineering students in particular. This course is divided into several chapters. The first chapter covers the hydrological cycle, while the second chapter addresses flooding conditions. The hydrology course also includes other chapters such as watercourse measurement techniques, surface drainage in the cistern, flood hydrograph characteristics, and standard water diagram. A brief overview of peak flooding, frequency studies, flood tracking, and flood prediction methods will also be covered. At the end of the course, the student will be able, with an engineering mindset, to understand and deal with basic hydrological vocabulary that is relevant to environmental engineers, such as water balance, calculating surface discharge for reservoirs, calculating peak floods, and deriving hydrographs for different sustainability, as well as other related topics.				
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Define the sources of water on the earth's surface and the hydrological cycle of water	Definition of hydrology, the hydrological cycle, hydrological applications in engineering,	My presence	My presence
2-4	6		Information Preparation: Double Cumulative Curve Method, Rainfall Data Presentation, Calculation, Precipitation	My presence	My presence
5	2		Depth-Area, Relationship for Sustainability: Depth-Area Relationship for a Rainstorm, Location-Specifying Formula	My presence	My presence

			Daily Quiz		
6	2	monthly exam	First monthly exam	My presence	My presence
7	2	Measures discharges of waterways, rivers, and streams	Level, Level Measurements, Stage, Manual Level Measurements, Automatic (Recorded)	My presence	My presence
8-9	4		Direct measurements of discharges: Area-velocity method, dilution, Hydraulic structures, slope-area method Elevation-discharge relationship	My presence	My presence
10-11	4	There are flood possibilities and flood protection methods	Surface runoff sections, hydrograph, runoff characteristics of streams, yield, empirical equations, sustainability-flow curve, runoff-sustainability curve characteristics, cumulative curve	My presence	My presence
12-13	4	Displays data with correlation coefficient between the original data and the generated data	Cumulative flow curve, calculation of storage volume	My presence	My presence
14	2	Recognizes the characteristics of groundwater and wells	Hydrograph, factors affecting hydrograph, hydrograph components	My presence	My presence
15	2	Monthly exam	second monthly exam	My presence	My presence

Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
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There is no practical component to the course.

11. Course Evaluation:

The grade out of 100 is distributed according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, and written exams, reports, etc.

First Monthly Exam (5 marks)

Second Monthly Exam (5 marks)

Daily Exams (30 marks)

Homework and Classwork (5 marks)

Class Activities and Participation (5 marks)

Final Exam (50 marks)

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Engineering Hydrology Translation: Basil Khader, Muhammad Suleiman, Sateh Mahmoud
Main references (sources)	Engineering Hydrology by Subramanya Applied Hydrology by Ven T. Chow
Recommended books and references (scientific journals, reports...)	Applied hydrology, McGRAW-HILL BOOK COMPANY Inc. Library of Congress. Catalog, Card Number 58-13860, ISBN 0-07-100174-3
Electronic References, Websites	

Course Description Form

1. Course Name:					
English-2					
2. Course Code:					
UOM2022					
3. Semester / Year:					
Fall/ 2025-2026					
4. Description Preparation Date:					
2-6-2026					
5. Available Attendance Forms:					
In-class					
6. Number of Credit Hours (Total) / Number of Units (Total):					
2 hours/ 2 units					
7. Course administrator's name (mention all, if more than one name):					
Dr. Hamid Adrees Al-Khashab					
8. Course Objectives:					
1. Study grammar, (verb tenses, structure sentence, question words, adverbs and adjectives, quantity, articles, verb pattern, prepositions, comparative and superlative). 2. Learn Vocabulary, focus on all academic words specifically in environmental engineering field. 3. Study comprehensive reading in variety subjects. 4. Focus on listening and speaking using videos and conversation between students in class. Study how to write an academic paragraph					
9. Teaching and Learning Strategies:					
Strategy		The topics will be covered by in-class, seminars and discussion in 2 hrs weekly.			
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	The student summarizes the content in English, familiarizing with the contents of the scientific report	Grammar / Verb tenses and examples (present, past, future) / Vocabulary / Reading, listening, speaking	In-class	Quizzes, Midterm, Seminar,
2	2		Grammar/ Verb tenses and examples (present) / Vocabulary / Reading, listening, speaking		
3	2	The student writes an essay and an email in a professional way	Grammar/ Verb tenses and examples (past) / Vocabulary / Reading, listening, speaking		
4	2	The student summarizes the content in English, familiarizing with the contents of the scientific report	Grammar/ Quantity/ Vocabulary / Reading, listening, speaking		
5	2		Grammar/ Verb tenses and examples (future) / Vocabulary / Reading, listening, speaking		
6	2		Grammar/ Comparative & Superlatives / Vocabulary / Reading, listening, speaking		

7	2		Grammar/ Verb tenses and examples (present perfect) / Vocabulary / Reading, listening, speaking	In-class	Quizzes, Midterm, Seminar
8	2	The student writes an essay and an email in a professional way	Grammar/ have to, should / Vocabulary / Reading, listening, speaking		
9	2		Midterm Exam		
10	2	The student summarizes the content in English, familiarizing with the contents of the scientific report The student writes an essay and an email in a professional way	Grammar/ Verb tenses and examples (past perfect) / Vocabulary / Reading, listening, speaking		
11	2		Grammar/ Verb tenses and examples (passive) / Vocabulary / Reading, listening, speaking		
12	2		Grammar/ Verb tenses and examples (present perfect continuous) / Vocabulary / Reading, listening, speaking		
13	2		Writing an academic paragraph / Reading, listening, speaking		
14	2		Grammar/ if condition / Vocabulary / Reading, listening, speaking		
15	2		Writing / Paraphrasing / Reading, listening, speaking		

Course Structure: Experimental

11. Course Evaluation:

Quizzes	2	10% (10)
Assignments	2	10% (10)
On sit Assignments	1	10%
Seminar	1	10
Midterm Exam	1 hr	10% (10)
Final Exam	3hr	50% (50)

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Headway Pre-Intermediate Student's Book-Fourth Edition
Main references (sources)	Headway Pre-Intermediate Student's Book-Fourth Edition
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://meet.google.com/yof-ngkn-ssc

Course Description Form

1.Course Name:					
Water quality Engineering					
2.Course Code					
ENV221					
3.Semester / Year:					
Spring Semester / 2026					
4.Description Preparation Date					
1/6/2026					
5.Available Attendance Forms:					
• In classroom • Google classroom. https://classroom.google.com/c/ODQyOTQ4ODMxNTU0?cjc=eqmrr06j					
6.Number of Credit Hours (Total) / Number of Units (Total)					
5Hours (3 hours) Theoretical part+(2hours) Practical part /7Units					
7.Course administrator's name (mention all, if more than one name)					
The theoretical part: Name: Mayada Hazim Email: mayada.hahm@uomosul.edu.iq The practical part: Name: Hanan Haqqi Ismail Email: hanan.eng2014@uomosul.edu.iq Name: Aaisha Mohand Yahya Email: aaisha.almokhtar@uomosul.edu.iq Name: Thura Azzam Abed Email: thura.azzam@uomosul.edu.iq					
8.Course Objectives					
Course Objectives	The Theoretical part: • Introduce the students to basic concepts on Water Quality Engineering. • Water resources (Surface water and ground water) • principal sources of water pollution • Water Quality Management (rivers, lakes and ground water) • Water quality criteria and standards, Laws and Regulations • Mechanism of pollutant fate in the environment • Modeling of water quality in natural systems.				
	The Lab part: • Providing students with the necessary experience and skills to monitor and analyze water quality. • Introducing students to the chemical concepts necessary to manage water quality and reduce pollution. • Teaching students how to analyze different water samples and how to conduct quality tests water.				
9.Teaching and Learning Strategies					
Strategy	This will be achieved through lectures, labs, individual & group assignments and e-learning platforms and tutorials. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.				
10.Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
The Theoretical part:					
1-2	6	Identify Principal sources of water pollution	Water resources, Sources of water pollution	Lecture in classroom, PowerPoint presentation, tutorial	Quiz, Homework, reports
3-4	6	Classify the physical, chemical and biological characteristics of water quality and Water quality standards	Water quality standards		
5	3	Define laws and legislation related water quality	Law and Regulation,		
6-8	9	Apply the principle of Mass balance to calculate DO Sag in river	Water quality management in rivers		

9-10	6	Apply the principle of mass balance of water quality modeling in lake	Water quality management in Lakes	PowerPoint presentation, electronic lectures and tutorial	Quiz, homework, reports
11	3	Identify the migration of pollutants in groundwater	Ground water quality		
12-13	6	Understand the Mechanism of pollutant Fate in environment and transport processes	Mechanism of pollutant Fate in the environment		
14-15	6	Understand the modeling of water quality in rivers	Modeling of water quality in natural systems		

The practical part

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Conducts chemical and physical laboratory tests on water	Introduction, sampling	Lecture in laboratory, power point, discussion	Report
2&3	4		Total Solid, Dissolved Solid, Suspended Solid.		
4	2		Turbidity, pH-meter, Electrical Conductivity		
5&6	4		Hardness, Ca ⁺² , and Mg ⁺²		Report, quiz
7&8	4		Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD).		Report
9	2		Sulphates		
10-11	4		Jar test		
12	2		Chlorides		Report, quiz

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Theoretical part		Practical part	
4 quizzes	16pts	4 quizzes	8pts
homework	6pts	reports	7pts
report	3pts		
Term Exam	10pt		
Final Exam	40pt	Final Exam	10pt
Total 100pt			

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Mackenzie L. Davis and Susan J.Masten "Principles of Environmental Engineering and Science", McGraw hill, USA, 3th,2004 APHA, AWWA, WPCF "Standard method for the examination of water and wastewater", 1985.
Main references (sources)	David A. Chin "Water quality engineering in natural system", John Wiley & Sons, Inc.,2006. عباوي , سعاد عيد و حسن , محمد سليمان "الهندسة العملية للبيئة – فحوصات الماء" دار ابن الاثير للطباعة للنشر -جامعة الموصل , 1990
Recommended books and references (scientific journals, reports...)	Roberts Alley,P.E."Water quality control Handbook" ,McGraw hill companies,inc.2007.
Electronic References, Websites	https://www.usgs.gov/special-topics/water-science-school/science/water-quality-information-topic https://link.springer.com/book/10.1007/978-3-030-23335-8

Course Description Form

1. Course Name:					
Concrete & Building Technology					
2. Course Code:					
ENV222					
3. Semester / Year:					
Spring / 2025-2026					
4. Description Preparation Date:					
1/6/2026					
5. Available Attendance Forms:					
In class					
6. Number of Credit Hours (Total) / Number of Units (Total):					
3 theory + 3 lab/ week / 6 units					
7. Course administrator's name (mention all, if more than one name):					
Mohammed Husham Shukur m.h.alkafaf@uomosul.edu.iq					
Ayad Abdullah Musa ayad_engineer@uomosul.edu.iq					
8. Course Objectives:					
This course is aimed principally at university and college students who wish understand the concrete for the purpose of using it in professional practice. The students must take sufficient care to ensure the selection of correct ingredients, for concrete making to achieve a suitable mix, and to obtain a technically sound execution of concrete works. They must also have an intimate knowledge of the interaction between the different components that go into making concrete, whether in a fresh state or in a hardened state. This knowledge is necessary for students to be competent engineers in their dealings with the concrete and construction materials that go into their manufacture. Moreover, this course aims to introduce students to the principles of building systems, construction methods and techniques, starting from the idea, feasibility study, preparation of plans, methods of implementation, and excavation. Besides that, the equipment and methods of transporting and compacting of concrete with its determinants, and an explanation of masonry units with their properties and methods of construction with them. The course aims to get students familiarized with structural as well as finish works to be implemented in construction process for the floors, walls, ceilings, with the construction problems & methods of treatment.					
9. Teaching and Learning Strategies:					
Strategy		This course has several components that include lectures, laboratory and field visits. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.			
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Identify the basic building materials used in building construction and their characteristics	Introduction to Concrete: Concrete definition, Concrete composition,	Classroom lecture	Quiz, homework, mid exam
2	3		Cement: Cement definition, Manufacture of Portland cement, Chemical composition of Portland cement clinker, Control Ratios		
3	3		Cement: Soundness, Consistency, Heat of hydration, Loss on ignition, Density and relative density, Bulk density.		
4	3		Mixing Water for Concrete: Introduction, Effects of impurities in mixing water on concrete properties		
5	3		Aggregates in Concrete: Definition, Characteristics		
6	3	Highlights the key stages of construction from foundations to finishes	Aggregates in Concrete: absorption and moisture conditions,		
7	3		Chemical Admixtures for Concrete:		
8	3	Applies the correct methods in excavation, foundations, formwork and pouring concrete	Fresh Properties of Concrete:		
9	3		Fresh Properties of Concrete: Segregation, Bleeding.		

10	3	Differentiates types of foundations, walls, ceilings and the choice of appropriate one	Fresh Properties of Concrete: Plastic shrinkage, Composition of fresh concrete		
11	3		Hardened Properties of Concrete:		
12	3	Implementation of construction works in accordance with technical requirements and safety conditions at work sites	Hardened Properties of Concrete: Tensile strength, Flexure strength, Modulus of elasticity, Poisson's ratio.		
13	3		Hardened Properties of Concrete: Shrinkage, Creep.		
14	3	Interprets and reads the executive plans of the construction of buildings	Hardened Properties of Concrete: Creep. Stairs		
15	3		Final Exam.		

Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Implementation of construction works in accordance with technical requirements and safety conditions at work sites	Introductory tour of the Building Materials and Engineering Reports Laboratory	Lab. experiments	Reports exams
2	3		Standard consistency and initial setting time of the cement paste using Vicat apparatus		
3	3		Compressive strength of the cement mortar		
4	3		Sieve analysis of aggregate (Fine and Coarse).		
5 & 6	3		Specific gravity, unit weight, surface moisture, and absorption capacity of the aggregate		
7	3		Properties of the fresh concrete (Workability, Proportion of sand, Unit weight).		
8	3		Capping, relationship between compressive strength of cubic and cylindrical specimens		
9	3		Steel reinforcement test		
10&11	3		Masonry unit tests (Red clay brick, Concrete block, Terrazzo, and Ceramic tiles).		
12	3		Non-destructive tests (Rebound hammer test).		
13	3		Non-destructive tests (Core test).		
14&15	3		Non-destructive tests (Ultrasonic pulse velocity test, Load test).		

11. Course Evaluation

		Time/Number	Weight (Marks)	Week Due	
Formative assessment	Quizzes	12	24% (2)	3-6,8-13, 14, and 15	
	Seminar	1	3% (3)	10	
	Lab./Report	5	5% (1)	3,4,5,6	
	Practical Report	8	8% (1)	3,4,5,6,7,8,	
Summative	Midterm	2hr	10% (10)	7	

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	S. H. Kosmatka and M. L. Wilson, Design and Control of Concrete Mixtures, Portland Cement Association, Fifteenth Edition Print History, USA, 2011.
Main references (sources)	Z. Sacko and A. Levon, Buildings Construction, Yes 9, University of Baghdad, College of Engineering, Department of Civil Engineering, Iraq, 2007.
Recommended books and references (scientific journals,...)	G. Owens, Fulton's Concrete Technology, Cement & Concrete Institute, Printing and Binding by Intrepid Printers (Pty) LTD, Midrand (South Africa), 2009
Electronic References, Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/

Course Description Form

1. Course Name:											
Survey Applications and GIS											
2. Course Code:											
ENV223											
3. Semester / Year:											
Spring/ 2025-2026											
4. Description Preparation Date:											
10 Feb.2025											
5. Available Attendance Forms:											
Classroom (https://classroom.google.com/c/ODQ0MTkzMzUxMDcz?cjc=f6peudoa) Practical lectures in the field											
6. Number of Credit Hours (Total) / Number of Units (Total)											
4 hours/ week /6units											
7. Course administrator's name (mention all, if more than one name)											
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Prof. Sabah Hussein Ali</td> <td style="width: 50%;">Email: sabah196004@uomosul.edu.iq</td> </tr> <tr> <td>Dr. kaythar A. Ibrahim</td> <td>kaythar6871@uomosul.edu.iq</td> </tr> <tr> <td>Mr. Ahmed Yassen Shehab</td> <td>ahmed910777@uomosul.edu.iq</td> </tr> </table>						Prof. Sabah Hussein Ali	Email: sabah196004@uomosul.edu.iq	Dr. kaythar A. Ibrahim	kaythar6871@uomosul.edu.iq	Mr. Ahmed Yassen Shehab	ahmed910777@uomosul.edu.iq
Prof. Sabah Hussein Ali	Email: sabah196004@uomosul.edu.iq										
Dr. kaythar A. Ibrahim	kaythar6871@uomosul.edu.iq										
Mr. Ahmed Yassen Shehab	ahmed910777@uomosul.edu.iq										
8. Course Objectives											
Course Object	1- Learning maps modeling through the elements of the arcgis10.6 program 2- Learning how to adjust the geodesic system of maps and site using GPS 3- Using Total Station in surveying works.										
9. Teaching and Learning Strategies											
Strategy	This course has several components that include classes & lectures, exams The Arabic language is adopted in this course										
10. Course Structure											
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method						
1	4	Learn map modeling through vector elements in ArcGIS10.6	Introduction to GIS What's GIS, the historical development, the application and Importance of GIS	Power point+ discussion	Homework						
2	4	The use of the Total station device in the surveying work	Introduction to the total station. How to calculate coordinates and Total Station.	Power point+ discussion	questions and answers						
3	4		Difference between Raster and vector	Power point+ discussion	QUIZ						
4	4		Explaining the main components of Total station and how to prepare it for work.	Practical explanation	Practical application + report						
5	4	Learn map modeling through vector elements in ArcGIS10.6	Review of the ArcGIS10.6 windows and the installation methods	Power point+ discussion	Application on personal laptop						
6	4	The use of the Total station device in the surveying work	Setting up the total station through the station's coordinates and angle.	Practical explanation	Practical application + report						
7	4	Learn how to adjust the geodesic system of maps and location using GPS	Created shapefiles of line, polyline and polygon for wells and towers	Power point+ discussion	Application on personal laptop						
8	4	The use of the Total station device in the surveying work	Setting up the total station through the station's coordinates and another point	Practical explanation	Practical application + report						
9	4		Spatial and attribute tables	Power point+ discussion	Report on the subjects						

10	4		Setting up the total station through required point and angle (Local Resection)	Practical explanation	Practical application + report
11	4		How to add f field to attribute tables	Power point+ discussion	Application on personal laptop
12	4		Setting up the total station through two points coordinates (Resection)	Practical explanation	Practical application + report
13-14	8	Learn map modeling through vector elements in ArcGIS10.6	GPS and geodetic system	Power point+ discussion	Application on personal laptop and report.
15	4	The use of the Total station device in the surveying work	Surveying & setting out	Practical explanation	Practical application + Practical exam

11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc ,
Theoretical part (daily, monthly and final exams) 50 marks
Practical part (daily, monthly, and final practical exams + reports) 50 marks

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Geographical Information System (Arabia Saudi). Leica FlexLine TS02/TS06/TS09 User manual
Recommended books and references (scientific journals, reports...)	GIS and Remote sensing .. principle and application
Electronic References, Websites	https://www.facebook.com/Hatem.Tarek.G

Course Description Form

1. Course Name:					
Microbiology					
2. Course Code:					
ENV224					
3. Semester / Year:					
Four / 2 nd year					
4. Description Preparation Date:					
June, 8, 2026					
5. Available Attendance Forms:					
In-person lectures					
6. Number of Credit Hours (Total) / Number of Units (Total):					
4 hrs. /6 units					
7. Course administrator's name (mention all, if more than one name):					
Dr. Shafaq T. Burhan, E-mail: shasbio108@uomosul.edu.iq Waad Mohammed Ali Abbas E-mail: waadd1976@uomosul.edu.iq					
8. Course Objectives:					
- Understand the fundamental concepts of microbiology and the importance of microorganisms in environmental systems. - Identify the major groups of microorganisms, including bacteria, fungi, algae, protozoa, and viruses, and describe their basic characteristics. - Explain microbial growth and the environmental factors affecting microbial activity, survival, and distribution. - Describe the role of microorganisms in biogeochemical cycles, organic matter decomposition, and ecosystem sustainability. - Evaluate the importance of microorganisms in water and wastewater treatment, waste management, and environmental protection. - Recognize waterborne and soilborne pathogens and assess their impacts on public health and the environment. - Apply basic microbiological techniques and laboratory methods used in environmental and water quality monitoring. - Analyze environmental problems related to microbial activity and propose appropriate solutions using modern environmental and biotechnological applications.					
9. Teaching and Learning Strategies:					
Strategy	This course includes several topics such as lectures, individual and group assignments, field visits, and e-learning platforms. The subject is taught in English, and all mandatory assignments must be submitted by the deadlines to be accepted for the exams. Basic laboratory work supports the lecture topics				
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Define the types of microorganisms, their characteristics, and environmental and engineering importance	Introduction to Microbiology	in-person	Quiz
2	2		Classification the microorganisms	homework	Exercises' solving
3	2		Bacterial cell chemistry	in-person	Quiz
4	2	Analyzes factors affecting the growth and activity of probiotic organisms	Bacterial growth in batch system and continuous flow system	homework	Exercises' solving
5	2	Assesses the impact of harmful and beneficial microorganisms on public health and the environment	Microorganisms in water and bacterial content	homework	Exercises' solving
6	2	Implements safety, sterilization and microbial control procedures within laboratories and environmental facilities	Detection of evidence of water contamination	homework	Exercises' solving
7	2		Bacterial habitats	homework	Exercises' solving

8	2		All above outcomes	in-person	Mid-term
9	2	Analyze the factors affecting the growth and activity of probiotic organisms	Biofilms	homework	Exercises' solving
10	2		Biological treatment	in-person	Quiz
11-12	2	Analyzes factors affecting the growth and activity of probiotic organisms	Bacterial acclimatization	homework	Exercises' solving
13-14	2		Natural microbiological environments	in-person	Quiz
15	2		All subjects	in-person	Final exam

Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Performs laboratory tests and techniques for the isolation and diagnosis of microorganisms	Laboratory Safety	homework	reporting
2	2		Sterilization and Disinfection	homework	reporting
3	2		The microscope	homework	reporting
4	2		Shapes of bacteria	homework	reporting
5	2			in-person	Quiz
6	2		Gram staining procedure	homework	reporting
7	2		Handling of bacteria cultures	homework	reporting
8	2		Examination of indicator organisms in water	homework	reporting
9	2	Comprehensive final practical exam.	All topics	in-person	Mid-term
10	2	Comprehensive final theoretical exam.	All topics	in-person	Final exam

11. Course Evaluation:

HomeWorks & Reports (20%), Quizzes (20%) & mid-term exam (10%)

Final Examination (50%)

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Environmental Microbiology for Engineers' by Volodymyr Ivanov.
Main references (sources)	Environmental microbiology-Academic Press (2014), by Ian L Pepper, Charles P Gerba and Terry J Gentry
Recommended books and references (scientific journals, reports...)	Principles of Environmental Engineering and Science, Mackenzie L. Davis and Susan J. Masten.
Electronic References, Websites	All environmental and practical microbiological Websites

Course Description Form

1. Course Name:					
Arabic 2					
2. Course Code:					
UOM2012					
3. Semester / Year:					
Spring/ 2025-2026					
4. Description Preparation Date:					
2026-6-7					
5. Available Attendance Forms:					
Direct communication					
6. Number of Credit Hours (Total) / Number of Units (Total):					
50/ 2 unit					
7. Course administrator's name (mention all, if more than one name):					
Asst. Lecturer Omar Hazim Hamed Mohammed					
8. Course Objectives:					
Course Objectives			The objective of this semester is to enable the student to read correctly and to develop the ability to use the language accurately in communication with others. This includes improving fluency, quality of delivery, and effective expression, as well as fostering good listening skill developing literary appreciation, and encouraging the use of clear and correct expressions.		
9. Teaching and Learning Strategies:					
Strategy		The primary aim of Arabic language lessons is to overcome the difficulty rigidity that may accompany some of the topics covered in these lessons addition, they seek to convey the required ideas and information to student ways that are clear, understandable, and appropriate to their individual differen Particular emphasis has been placed on Arabic grammar and literature. The cou is delivered through lectures, examinations, classroom assignments discussions, as well as homework assignments.			
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Arabic grammar rules (masculine)	To introduce the student to the importance of practicing writing and speaking rules in Standard Arabic	Reading and writing	Good
2	2	The present tense verb (Al-Mudari' verb)	To introduce the student to the levels of the Arabic language system.	Reading Reading	Good
3	2	Dual form and plural form	To deepen the student's connection with Arab and Islamic heritage	Reading and writing	Good
4	2	sound plural and feminine sound plural)	To promote scientific research in the field of Arabic language and its sciences in order to prepare studies and research.	Reading	Very good

5	2	Verbal rhetorical devices (Al-Muhassināt Al-Lafziyyah) agreement)	To demonstrate the beauty of the Arabic language, its vast meanings, and its expressive styles	Reading	Very good
6	2	Numbers and counted nouns (number and counted noun	To enable the student to overcome linguistic errors and correct them.	Reading and writing	Good
7	2	Accusative nouns (the nouns in the accusative case)	To develop the student's literary taste in order to perceive the aesthetic aspects of expression, imagery, and meanings in speech.	Reading and writing	Good

Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Abbasid literature	Literary life in the early and late Abbasid eras	Reading	Good
2	2	Poet Abu Tammam	Al-Badi' in the poetry of Abu Tammam and its relation to Al-Buhturi	Reading	Good
3	2	Poet Abu Firas Al-Hamdani	The literary and social life of Abu Firas	Reading	Good
4	2	Poet Al-Mutanabbi	Introduction to the relationship between Abu Firas and Al-Mutanabbi	Reading	Good
5	2	"Say and Don't Say"	linguistic errors and spelling	Reading and writing	Very good
6	2	Ibn al-Rumi	The impact of Ibn al-Rumi's poetry on life in the Abbasid era — Ibn al-Rumi Reading		
7	2	Introductions to ethics	Introductions to ethics — Qur'anic verses	Reading and listening	Very good

11. Course Evaluation:

Quizzes = 25

Homework = 15

Mid-term exam = 10

Total = 50

Final exam = 50

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Al-Nahw Al-Wafi (Comprehensive Grammar) — Abbas Hassa
Main references (sources)	In Abbasid Literature — Muhammad Mahdi Al-Basir
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:					
Computer II					
2. Course Code:					
UOM2032					
3. Semester / Year:					
Spring / 2025-2026					
4. Description Preparation Date:					
June 03, 2026					
5. Available Attendance Forms:					
Blended Learning (Class Lectures & Practical Laboratory Sessions)					
6. Number of Credit Hours (Total) / Number of Units (Total):					
4 Hours/ week / 3unit					
7. Course administrator's name (mention all, if more than one name):					
Jumana Abdullah Kareem, E-mail: jumana.abdulla@uomosul.edu.iq Mohammed Abdullhadi E-mail: mohammedalhaily@uomosul.edu.iq					
8. Course Objectives:					
1. Provide a foundational understanding of network topologies, structures, and security paradigms. 2. Demystify Electronic Commerce architectures, transaction security, and digital banking frameworks.			3. Equipped students with hands-on skills for identifying, diagnosing, and repairing common hardware/software system failures. 4. Deliver a comprehensive conceptual introduction to Artificial Intelligence (AI), its foundational subsets, real-world utility, and ethical boundaries.		
9. Teaching and Learning Strategies:					
Strategy	1. Interactive Class Lectures: Conceptual breakdown of technology models backed by real-world case studies. 2. Practical Laboratory Sessions: Hands-on application using Matlab, and interactive AI application exploration. 3. Problem-Based Learning (PBL): Assigning hardware/software troubleshooting scenarios to build analytical skills.				
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	Understand network types, structural elements, basic topologies, and core threat vectors	Security and Networking:	Lecture & Interactive Discussion	Midterm Exam & Quizzes
3	2	Identify common network troubleshooting methodologies and diagnostic strategies.	Network Troubleshooting:	Lecture & Case Analysis	Quizzes & Class Performance
4-5	4	Comprehend digital transaction infrastructures, banking security, and automated client services.	E-Commerce:	Lecture & System Demos	Midterm Exam
6-7	4	Diagnose foundational computer processing errors, peripheral failures, and core operating system issues.	Computer Troubleshooting:	Lecture & Visual Examples	Assignments & Written Tests
8-9	4	Explain the chronological evolution, foundational theories, and structural branches	Introduction	Lecture & Concept Mapping	Midterm Exam

10-11	4	Critique the mechanics behind cognitive assistant tools and algorithmic mobile processing	AI in Our Daily Lives	Lecture & Application Review	Quizzes
12-13	6	Analyze the paradigm shift driven by AI applications across critical industrial and financial sectors.	Applications of AI	Lecture & Case Studies	Case Presentation/ Exam

Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	Familiarize students with MATLAB modern IDE, workspace, command window, basic syntax, and matrix operations.	Introduction to MATLAB Environment and Core Principles:	Lab Demonstration & Hands-on Coding	Lab Sheet Assessment & Attendance
3	2	Enable students to create, customize, and manipulate 2D plots using proper labels, titles, and legends.	Data Visualization I	Guided Lab Exercise	Practical Lab Quiz
4-5	4	Master advanced plotting techniques including multiple plots, subplots, and basic 3D data visualization.	Data Visualization II	Interactive Software Lab	Assignment Submission
6-7	4	Solve first-degree (linear) mathematical equations and algebraic systems using MATLAB commands.	Solving First-Degree Mathematical Equations	Problem-Based Lab Workshop	Written Lab Test
8-9	4	Resolve second-degree (quadratic) equations and polynomials, identifying both real and complex roots.	Solving Second-Degree Equations & Polynomials:	Hands-on Troubleshooting	Performance Evaluation
10-11	4	Deploy specialized built-in MATLAB mathematical functions for calculus, formatting, and numeric analysis.	Advanced Built-in Mathematical Functions	Tool-Driven Programming Lab	Lab Output Verification
12-13	6	Understand the principles of block diagram modeling and build basic dynamic system simulations.	Introduction to Simulink	Group Lab Projects	Project Model Defense
14	2	Execute, analyze, and troubleshoot simulated dynamic models within the Simulink environment.	Simulink Model Simulation & Analysis	Guided Auditing Lab	Written Review Report
15	2	Demonstrate comprehensive mastery in writing MATLAB scripts, solving equations, and modeling in Simulink.	Comprehensive MATLAB & Simulink Practical Review	Final Lab Practicum	Practical Final Examination

11. Course Evaluation:

Aligned with standard Bologna Process scoring distributions for a 3 ECTS course **Formative Continuous Assessment (50%)**:

1- Theoretical Quizzes (Minimum 2): 10%, 2- Practical Laboratory Worksheets & Assignments: 10%

3- Report 10%, 4- Midterm Written Examination: 10%, 5- Practical Midterm Lab Exam: 10%

Summative Final Assessment (50%):

1- Final Theoretical Written Examination: 30%, 2- Final Practical Laboratory Examination: 20%

Total Evaluation Score: 100%

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Fundamental Concepts of Computer Science and Emerging Technologies, 2
Main references (sources)	1. Kurose, J. F., & Ross, K. W. Computer Networking: A Top-Down Approach. (For Modules 1 & 2). 2. Russell, S., & Norvig, P. Artificial Intelligence: A Modern Approach. (For Modules 4 to 9).
Recommended books and references (scientific journals, reports...)	IEEE Intelligent Systems Journal / ACM Transactions on Computer System
Electronic References, Websites	1. Coursera / edX: Introduction to Artificial Intelligence & Network Fundamentals. 2. MIT Open Course Ware (Computer Science and Artificial Intelligence Laboratory - CSAIL).

Course Description
Environmental Engineering
Department
College of Engineering
University of Mosul
Third Year / Bologna Process

Third Year

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem			
UGIII	Five	1	ENV311	Principles of Air pollution	مبادئ تلوث الهواء	English	3						3	48	77	125	5.00	C	
		2	ENV312	Water Supply Networks	شبكات امدادات المياه	English	3				1		3	63	62	125	5.00	C	ENV212
		3	ENV313	Solid Waste Engineering	هندسة النفايات الصلبة	English	3				1		3	63	62	125	5.00	C	
		3	ENV314	Unit Operations & Processes	عمليات المعالجة	English	2		2		1		3	78	47	125	5.00	C	
		5	ENV315	Sustainability Engineering	هندسة الاستدامة	English	2						3	33	67	100	4.00	C	
		6	ENV316	Engineering safety and ethics	السلامة الهندسية واخلاقيات المهنة	Arabic	2			1			3	48	27	75	3.00	C	
		7	ENV317	Differential Equation	المعادلات التفاضلية	English	2						3	33	42	75.00	3.00	S	
						Total	17	0	2	1	3	0	21	366	384	750	30.00		
														23					
	Six	1	ENV321	Hydraulics Applications	تطبيقات الهيدروليك	English	4						3	63	62	125	5.00	C	
		2	ENV322	Sewers Networks	شبكات المجاري	English	3				1		3	63	87	150	6.00	C	
		3	ENV323	Noise Pollution	تلوث الضوضاء	English	2						3	33	67	100	4.00	C	
		4	ENV324	Soil Mechanics	ميكانيك التربة	English	3		3				3	93	57	150	6.00	C	
		5	ENV325	Engineering Project Planning and Design	تصميم وتخطيط المشروع الهندسي	English	2						3	33	17	50	2.00	C	
		6	ENV326	Numerical Analysis	تحليلات عددية	English	2				1		3	48	27	75	3.00	S	
		7	ENV327	Reinforced Concrete	الخرسانة المسلحة	English	2				1		3	48	52	100	4.00	C	
						Total	18	0	3	0	3	0	21	381	369	750	30.00		
														24					

Course Description Form

1. Course Name:					
Principles of Air pollution					
2. Course Code:					
ENV311					
3. Semester / Year:					
Fall/2025					
4. Description Preparation Date:					
15/09/2025					
5. Available Attendance Forms:					
In Classroom- google classroom					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3hr/ 5 units					
7. Course administrator's name (mention all, if more than one name)					
Name: Dr. Mohammed Salim Shihab, Email: shihab77@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		- Define of the air pollutants, their sources and effects in the atmosphere, (i, vii) - Classifying of air pollutants, (i) - Knowing Air pollution legalization and amendments, (i) - Predicting of emission source and concentration from different sources, (ii) - Detecting the emission limits and comparing with the locale standards. (ii)			
9. Teaching and Learning Strategies					
Strategy		Lecture notes, PowerPoint presentations, Videos, project,			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Recognizes air pollutants, their sources and their effects in the atmosphere	Introduction to the atmosphere: Definition of layers of the atmosphere, air pollution effects	Lecture notes PowerPoint	Quizzes and Home Works
2-3	6	Determines emission concentration, compares it with global standards, and classifies air pollutants	Classifying types of air pollutants, their sources and concentrations, classification of air pollutants,		
4	3	Explain legislation air pollution in relation to air pollution and its amendments	Explaining of Air pollution legalization and amendments		
5	3	Determines emission concentration and compares it to global standards	Description of Concentration Units and Air Quality Index (AQI)	Lecture notes	
6-9	12	Recognizes air pollutants, their sources and their effects in the atmosphere	Air pollution and meteorology: Definition of wind rose, pressure gradients, adiabatic lapse rate, atmospheric stability, radiation inversion, smoke plumes patterns.	Lecture notes PowerPoints videos	Quizzes and Home Works Midterm exam
10-13	12	Analyzes concentrations of emission sources from different sources	Analysis of Mathematical Models: The point source Gaussian plume model, A line-source dispersion model, Area-source models,	Lecture notes PowerPoints	Quizzes and Home Works

14-15	6	Analyzes concentrations of emission sources from different sources	Analysis of Indoor air quality model.	Lecture notes	Quizzes and Home Works
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11.Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Quizzes	10pt
homework	10pt
Classwork	10pt
Reports	10pt
semester term Exam	10pt
Final Exam	50pt
Total	100pt

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	• Mackenzie A. Davis, Davis A. Cornwel , Introduction to Environmental Engineering ,Chapter (9) , Air pollution ,6th ed. McGraw-Hill, ISBN 978-007-125922-4, 2023. • Masters, GM, Introduction to Environmental Engineering and Science, Chapter (7) , Air pollution, 3rd ed. Prentice Hall, ISBN 0 – 13 – 155384 – 4,2014. • Wark, K, Warner, CF and Davis, WT, Air Pollution – its origin and control. Addison-Wesley ISBN 0- 673-99416-3, 1998.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:					
Water supply networks					
2. Course Code:					
ENV312					
3. Semester / Year:					
Spring (2025-2026)					
4. Description Preparation Date:					
25/5/2026					
5. Available Attendance Forms:					
Class room					
6. Number of Credit Hours (Total) / Number of Units (Total):					
4hr/ 5 units					
7. Course administrator's name (mention all, if more than one name):					
Dr. Layth Abdulaleem Mahmood Laythabdulaleem@uomosul.edu.iq					
8. Course Objectives:					
Course Objectives	1-Describing the main components of water supply network system including water pipes network, pump station, and service storage tanks. 2-Describing all parameters that correlate with network such as valves, pipe materials, loads exerted on pipes. 3-Learning the engineering methods that used to analysis and design of the main components of water supply network system. 4-Learning analysis and design of network using WaterCAD software.				
9. Teaching and Learning Strategies:					
Strategy	The course will be covered by class room lectures; three hours each week for explaining the materials with giving examples, and one hour each week for tutorials problems. Explanation of necessary computer software will be given and a project on actual network will be submitted by one student.				
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Describes the primary and secondary components of a water supply network	Hazen Williams equation and its applications, equivalent pipe.	Classroom Lectures	Quizzes, Semester exam, Final exam, And project
2	4		Water distribution network, Demand allocation, skeletonization Distribution methods, types of distribution networks.		
3-5	12	Use Engineering methods in the analysis and design of the water supply network	Design and analysis of networks, design considerations, Hardy Cross method, Fire hydrants.		
6-7	8		Using Warter CAD software in analysis and design of water supply networks		
8-9	8	Use Engineering methods in the analysis and design of the water supply network	Types of service storage tanks, computation of volume of for each part of tank, location of service tank, tank maintenance		
10-12	12		Pump stations, system head curve, Pump curves, pump selection, Pumps in series and in parallel, cavitation phenomenon, types of pumps.		

13	4	Describes the primary and secondary components of a water supply network	Types of pipes materials, types of valves.		
14-15	8	Applies the necessary skills in network design and analysis using computer programs	Loads on buried pipes, pipe bedding, thrust forces.		

Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

11. Course Evaluation:

8 Quizzes	25 pt
Project	7 pt
Seminar	4 pt
Report	4 pt
Mid exam	10 pt
Final exam	50 pt
Total	100 pt

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	
Main references (sources)	1-McGhee, T. G., 1991, Water Supply and Sewerage, 6th ed., McGraw-Hill, Inc. 2-Mays, L. W. (Editor), 2000, Water Distribution Systems Handbook, McGraw-Hill, Inc.
Recommended books and references (scientific journals, reports...)	Davis M. L., 2010, Water and wastewater engineering: design principles and practice. McGraw-Hill Inc.
Electronic References, Websites	

Course Description Form

1. Course Name:					
Solid Waste Engineering					
2. Course Code:					
ENV313					
3. Semester / Year:					
Spring / 2025-2026					
4. Description Preparation Date:					
1/ 9/ 2025					
5. Available Attendance Forms:					
In Class					
6. Number of Credit Hours (Total) / Number of Units (Total):					
4 /5					
7. Course administrator's name (mention all, if more than one name):					
Name: Dr. Anas Fakhry Qassid Email: anasfq@uomosul.edu.iq					
8. Course Objectives:					
Course Objectives		The course would cover-general introduction including definition of municipal solid waste; legal issues and requirements for solid waste management; sampling and characterization of solid waste; analysis of solid waste constituents; health and environmental issues related to solid waste management; steps in solid waste management including solid waste reduction at source, collection techniques, materials and resource recovery/recycling, transport, optimization of solid waste transport, treatment and disposal techniques (composting, incineration, refuse derived fuels, landfilling).			
9. Teaching and Learning Strategies:					
Strategy		This course has several components that include lectures, assignments, exams. Exercises design the solid waste collection for each student. The course will be taught in Arabic, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.			
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Explains the impact of physical and chemical solid waste properties on treatment and disposal methods	Objectives, Evolution of Solid-Waste Management	In Class	Quizzes Homework Semester Exam Project Final Exam
2	4		Legislative Trends and Impacts		
3	4		Sources, Types, and Composition of Municipal Solid Wastes		
4	4	Uses engineering principles and analysis tools in the evaluation of solid waste management systems	Application examples about composition of solid waste		
5	4		Physical properties of municipal solid waste		
6	4	Applies environmental standards and specifications in the design and operation of waste management systems	Chemical properties of municipal solid waste		
7	4		Biological Properties of Municipal Solid Waste		
8	4		Sources, Types, and Properties of Hazardous Wastes Found in Municipal Solid Waste		
9	4	Calculates waste generation rates, density, volume, and required collection and transportation quantities	Solid Waste Generation and Collection Rate		
10	4		Waste Handling and Separation, Storage, and Processing at the Source		
11	4		Collection of Solid Waste		

12	4	-----	Mid-Term Exam		
13	4	Designs engineering systems for the collection, transportation, treatment and disposal of solid waste according to approved standards	Transfer and Transport		
14	4	Proposes innovative solutions and technologies to improve waste reduction, reuse and recycling processes	Separation and Processing and Transformation of Solid Waste		
15	4		Disposal of Solid Wastes and Residual Matter		
16	Preparatory week before the final Exam				

Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

11. Course Evaluation:

6 quizzes	14pt	
4 homework	4pt	
Project	20pt	
Report	2pt	
Mid-Term Exam	10pt	
Final Exam	50pt	
Total	100pt	

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	George Tchobanoglous "Integrated Solid Waste Management", McGraw hill ,new york, 1993.
Main references (sources)	Michael D. LaGrega "Hazardous Waste Management", McGraw hill ,new york, 2001.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:					
Unit Operations & Processes					
2. Course Code:					
ENV314					
3. Semester / Year:					
Fall / 2024-2025					
4. Description Preparation Date:					
24/11/2024					
5. Available Attendance Forms:					
In person classes					
6. Number of Credit Hours (Total) / Number of Units (Total):					
5 hours / week / 5 units					
7. Course administrator's name (mention all, if more than one name):					
Name: Dr. Abdullah I. Ibrahim, Email: abdullah.ibrahim@uomosul.edu.iq Dr. Waad M.A. Abbas Email: waadd1976@uomosul.edu.iq					
8. Course Objectives:					
Course Objectives	- Recognize the common physical, chemical and biological unit operations encountered in treatment processes. - Apply the basic concepts of sciences and engineering to solve issues associated with the treatment of wastewater. - Formulate a preliminary concepts of wastewater treatment process including batch, complete mix, and plug flow reactors. - Develop and solve design problems and analyze the data to evaluate the feasibility of a components of the wastewater treatment plant. - Report the data obtained from the site visits to WWTP that will be organized during the course. - Demonstrate the ability to lead and productively participate in group situations via assigning multidisciplinary design projects for specific wastewater unit processes and operation.				
9. Teaching and Learning Strategies:					
Strategy	Students will be prepared to achieve the objectives of class. Evaluation of student be performed relying on home works, daily, and mid-term exams.				
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	6	Defines the principles of treatment processes and their units used in water and wastewater treatment	Characteristic of wastewater	In Class Power Point Lectures	Quiz 1
4-7	8	Explains the mechanisms of mass and energy transfer associated with different processing processes	Kinetic reactions reactors.	In Class Power Point Lectures	Quizzes 2 & 3
8-10	6	Analyzes the performance of physical and chemical processing units and evaluates their operational efficiency	Physical operating units	In Class Power Point Lectures	Midterm exam
11-12	4	Calculates design and operational parameters of treatment units such as sedimentation, filtration and adsorption	Biological operating units	In Class Power Point Lectures	Quizzes 4 & 5
13-14	4	Applies the principles of selecting and operating appropriate treatment processes according to the type of contaminants and treatment requirements	chemical operation units	In Class Power Point Lectures	Quiz 6
Final Exam					

Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Effect of pH on chemical precipitation	Chemical precipitation	homework	reporting
2	2	Phosphate precipitation	Chemical precipitation	homework	reporting
3	2	Effect of zinc sulphate concentration of organics precipitation	Chemical precipitation	homework	reporting
4	2	Suspended solids settling velocities	Settling column	homework	reporting
5	2	Optimum settling time	Settling column	homework	reporting
6	2	Testing the above outcomes	All above topics	in-person	Quiz
7	2	Effect of aeration rate on biological treatment	Biological treatment	homework	reporting
8	2	Effect of F/M ratio on biological treatment	Biological treatment	homework	reporting
9	2	Cation and anion resins effect on ion exchange capacity	Ion exchange	homework	reporting
10	2	Comprehensive final practical exam and Final course portfolio submission	All topics	in-person	Mid-term exam
11	2	Comprehensive final theoretical exam and Final course portfolio submission	All topics	in-person	Final exam

11. Course Evaluation:

6 Daily Exams (10) + 1 Monthly Exams (30) + 5 Homework (10) + Final Exam (50)

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	None
Main references (sources)	• Tchobanoglous, G., F. L. Burton, and H. D. Stensel. Wastewater Engineering: Treatment and Resource Recovery. 5th ed. Metcalf and Eddy Inc., New York, NY: McGraw-Hill, 2003. ISBN: 978-0-07-340118-8. • Qasim, Syed R., Guang Zh. Wastewater Treatment and Reuse, Theory and Design Examples, Volume 1: Principles and Basic Treatment, 1st ed. Taylor & Francis Group, LLC, 2018. ISBN:13: 978-1-138-30089-7
Recommended books and references (scientific journals, reports...)	Davis, M. L., (2010). "Water and wastewater engineering design principles and practice", McGraw- Hill, Inc., 1300
Electronic References, Websites	N one

Course Description Form

1. Course Name:					
Sustainability Engineering					
2. Course Code:					
ENV315					
3. Semester / Year:					
Fall / 2025-2026					
4. Description Preparation Date:					
01/10/2025					
5. Available Attendance Forms:					
In person and electronic (Google Classroom - qjj57gop)					
6. Number of Credit Hours (Total) / Number of Units (Total):					
2hr/ week / units 4					
7. Course administrator's name (mention all, if more than one name):					
Name: Dr. Omar M. Abdulkareem, Email: omaralhakeem@uomosul.edu.iq					
Name: Taha A. Al-tayyar, Email: ta_tayyar@uomosul.edu.iq					
8. Course Objectives:					
Course Objectives	- Learn about the principles, indicators and general concept of sustainability; - Get a useful acquaintance about the features of sustainable concrete in accordance with the sustainable concept through identifying the ecological impacts of cement and concrete production, - Apprehend the local, regional and global impacts of unsustainable designs, products and processes; - Explore the types of new and renewable energies, and have in-depth knowledge about the eutrophication; - Your ability to use the mathematical and the scientific principles with the sustainability concepts in engineering.				
9. Teaching and Learning Strategies:					
Strategy	Power Point Presentations				
10. Course Structure:					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	Links the principles, indicators and concept of climate change in general, urban resilience, and sustainability	Sustainable development, Conceptions, Development & applications	Presentation	-
3-4	4		Renewable Energy, New and renewable energy, Sun energy, Wind energy, Waterfalls energy, etc.,	Presentation	Quiz 1
5	2		Eutrophication in surface water, Types of algae, causes, their results on water quality, treatment plants, modeling of nutrients cycles	Presentation	Quiz 2
6-7	4	Evaluates the characteristics of sustainable buildings in line with the concept of sustainability	Sustainability of concrete: Introduction, Negative environmental effects of cement and concrete industries, Environmental concerns	Presentation	Quiz 3 & 4
8-9	4	Describes the local, regional, and global impacts of unsustainable designs, products, and processes	Environmental impacts of Portland cement production: Description of cement production process, Main impacts, Environmental sustainability.	Presentation	Report 1
10	2		Environmental impacts of cement manufacture – Mathematical calculations	Presentation	Quiz 5

11	2	Introduce new and renewable energies, and gain in-depth knowledge of the phenomenon of food enrichment	Sustainable read mix plant-Case study: Introduction, Transportation of materials, Example of sustainable ready-mix plant, Conclusion.	Presentation	Quiz 6 + Report 2
12-13	4	Assesses environmental impacts in terms of greenhouse gas (GHG) emissions, suspended particulate matter, and solid waste in the cement industry using mathematical relationships	Noise control in the cement manufacture: Introduction, Sources of noise in cement works, Harm of noise in cement plant, Basic principles of noise control, Noise abatement in cement plant.	Presentation	Mid Exam
14-15	4	Applies mathematical principles with sustainability concepts in engineering, such as estimating needs, consumption, and cost of renewables in a city	Concrete with construction and demolition wastes (CWD): Introduction, Construction & demolition wastes uses, Construction & demolition wastes classification, Construction & demolition wastes composition, Construction & demolition wastes management, Construction & demolition wastes reuses.	Presentation	Quiz 7 + Report 3
Final Exam					
11. Course Evaluation:					
7 Daily Exams (28) + 1 Mid Exam (10) + 3 Reports (12) + Final Exam (50)					
12. Learning and Teaching Resources:					
Required textbooks (curricular books, if any)			None		
Main references (sources)			P-C, Aïtcin and S. Mindess, Sustainability of concrete - Modern concrete technology series 17, 1st edition, Spon Press, Taylor & Francis Group, 2011. G. M. Sabnis, Green building with concrete- Sustainable design and construction, CRC Press, Taylor & Francis Group, 2012. F. Pacheco-Torgal, S. Jalali, J. Labrincha and V. M. John, Eco-efficient concrete, Woodhead publishing limited, 2013. K. E. Peray, Cement manufacture' s handbook, Chemical publishing Co., Inc., 1979. M. Davis and S. Masten, Principles of environmental engineering and science, McGraw-Hill, Inc., 2004.		
Recommended books and references (scientific journals, reports...)			None		
Electronic References, Websites			None		

Course Description Form

1. Course Name:					
Engineering Safety and Ethics					
2. Course Code:					
ENV316					
3. Semester / Year:					
Autumn Semester / 2025-2026					
4. Description Preparation Date:					
1/9/2025					
5. Available Attendance Forms:					
Inside the class, online https://classroom.google.com/c/ODA5Njg5MzI0MzEw?cjc=unlfmtd					
6. Number of Credit Hours (Total) / Number of Units (Total):					
3 hour per week/ 3 units					
7. Course administrator's name (mention all, if more than one name):					
Hanan Haqi Ismail - Email: hanan.eng2014@uomosul.edu.iq Thura Azzam Abed thura.azzam@uomosul.edu.iq					
8. Course Objectives:					
Course Objectives:		- Human development and public life - Public safety and its relationship to public health and occupational safety - The objectives, laws, and regulations of public safety - Understanding the outcomes of work in public safety			
9. Teaching and Learning Strategies:					
Strategy		This course will include numerous in-person and online lectures. Students will also be assigned homework and reports. Field visits to environmental projects will be conducted for students. The language of instruction will be Arabic, and Arabic textbooks will be used.			
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Define the professional obligations of the engineer	Engineering ethics curriculum vocabulary - the concept of professional ethics linguistically and idiomatically	Power point lecture	exam
2	3	Adheres to the ethics of the engineering profession	Sources of professional ethics - ethics of practicing the profession.	Power point lecture	exam
3	3		Subjective obligations imposed on the engineer under the ethics of engineering practice, and the societal obligations for engineering practitioners.	Power point lecture	exam
4	3		Honor codes, regulations, and official pledges in engineering work, and the engineer's obligations toward the environment	Power point lecture	exam
5	3		Adheres to the most important safety measures to be followed in the workplace	Introduction: Includes an overview of the concept of safety and its role in human development system and public life.	Power point lecture
6-7	6	An overview of OSHA and its goals, and its legislations in defining the responsibilities of the employer and employees		Power point lecture	exam

8-9	6	Defines the most important functions of management in detail	Definition of general management and its five functions, and public safety management.	Power point lecture	exam
10-11	6		Management functions: a detailed explanation of the functions	Power point lecture	exam
12-13	6		Ergonomics (Human Factors Engineering): 1. Its goals and fields. 2. The national strategy for public safety, occupational health, and securing the work environment. 3. Public safety culture, factors.	Power point lecture	exam
14	3	Applies the most important legislation and public safety laws that define the responsibilities of the employer and workers and the relationship between them	Appropriate work environment: 1. The most important factors affecting the work environment, 2. Responsibility for implementing the occupational safety program. 3. Responsibilities of the employer and workers.	Power point lecture	exam
16	3	Identify physical hazards, chemical hazards, damages and injuries resulting from them	Personal Protective Equipment (PPE): Its importance, advantages, disadvantages, and types.	laboratory	Class work

Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

11. Course Evaluation:

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

three quizzes	15
H.W	10
report	10
C.W	5
term Exam	10pt
Final Exam	50pt
Total	100pt

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Public Safety Code for Construction Project Implementation (Iraqi Building Code) issued by the Ministry of Construction.
Main references (sources)	Code of Ethics for the Practice of Engineering
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:					
Differential Equations					
2. Course Code:					
ENV317					
3. Semester / Year:					
Autumn /2025-2026					
4. Description Preparation Date:					
01/06/2026					
5. Available Attendance Forms:					
In class					
6. Number of Credit Hours (Total) / Number of Units (Total):					
3 hours/week / 3 units					
7. Course administrator's name (mention all, if more than one name):					
Dr. Salim Yousif Awad E-mail:					
8. Course Objectives:					
Differential equations have wide applications in various engineering and science disciplines. In general, modelling variations of a physical quantity, such as temperature, pressure, displacement, velocity, stress, strain, or the concentration of a pollutant, with respect to time t or location (x, y, z) , or both, would require differential equations. Similarly, studying the variation of a physical quantity with respect to other physical quantities would lead to differential equations. Engineers need to model physical problems using mathematical equations and then solve them to study the underlying concerns.					
9. Teaching and Learning Strategies:					
Strategy		This course has several components, including lectures, individual & group assignments, and e-learning platforms. Exercises involving the use of computer application tools to understand specific unit processes. The course will be taught in English.			
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Distinguish differential equations	Introduction to Differential Equations	lecture	assignments
2	3		First Order ODEs – Separable	lecture	assignments
3	3		Linear First Order Equations	lecture	assignments
4	3		Exact Equations	lecture	assignments
5	3	Applies differential equations	Applications (Growth/Decay)	lecture	QUIZ
6	3	Distinguish differential equations	Second Order ODEs	lecture	assignments
7	3		Midterm Exam	exam	EXAM
8	3	Distinguish differential equations	Non-homogeneous Equations	lecture	assignments
9	3		Undetermined Coefficients	lecture	assignments
10	3		Variation of Parameters	lecture	QUIZ
11	3		Euler Cauchy differential Equations	lecture	QUIZ
12	3	Applies differential equations	Second Order ODEs Applications	lecture	assignments
13	3	Distinguish differential equations	Systems of Equations	lecture	assignments

14	3	Formulates differential equations	Term project	lecture	REPORTS
15	3	Distinguishes, applies, and formulates differential equations	Review	lecture	assignments
16	3		Final Preparation	exam	EXAM

Course Structure: Experimental: NONE

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

11. Course Evaluation:

	Time/Number	Weight (Marks)	Week Due
Formative assessment	Quizzes	4	30 % (40)
	Assignments	2	10 % (40)
	Projects / Lab.		
	Report		
Summative assessment	Midterm Exam	2hr	10% (10)
	Final Exam	3hr	50% (50)
Total assessment	100% (100 Marks)		

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	ERWIN KREYSZIG "Advanced Engineering Mathematics", JOHN WILEY & SONS, INC., 2011
Main references (sources)	
Recommended books and references (scientific journals, reports...)	Wei-Chau Xie "Differential Equations for Engineers", CAMBRIDGE UNIVERSITY PRESS, 2010
Electronic References, Websites	https://classroom.google.com/c/ODE0OTAyMjMxNDQy

Hydraulic Applications Course Description

1. Course Name:					
Hydraulic Applications					
2. Course Code:					
ENV321					
3. Semester / Year:					
Spring / 2025–2026					
4. Description Preparation Date:					
30/05/2026					
5. Available Attendance Forms:					
In-person lectures and classroom discussions					
6. Number of Credit Hours (Total) / Number of Units (Total):					
6 hours per week / 5 units					
7. Course administrator's name (mention all, if more than one name):					
Mohammed Salim Mahmood, Email: mohammedsalim@uomosul.edu.iq					
8. Course Objectives:					
Course Objectives	- Distinguish between open conduits and closed conduits in environmental engineering systems. - Understand and analyse open-channel flow, including uniform and non-uniform flow conditions. - Define and apply specific energy, critical depth, and surface-profile concepts in gradually varied flow. - Solve engineering problems involving hydraulic gradient lines, total energy lines, and energy of flowing liquid in open channels. - Understand and solve problems related to flow measurement and hydraulic control points. - Explain pressure surges (water hammer), their causes, effects, and basic design considerations. - Apply hydraulic similarity and flow similitude concepts for model–prototype relationships. - Recognise the hydraulic role and environmental applications of multiport diffuser outfalls.				
9. Teaching and Learning Strategies:					
Strategy	Lectures supported by worked numerical examples, problem-based learning, class discussion, homework assignments, quizzes, and a mid-term examination. Students apply Chezy and Manning equations, specific-energy concepts, hydraulic-jump analysis, water-hammer calculations, and hydraulic-model similarity principles to practical environmental-engineering systems.				
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1–2	6	Predicts the additional pressure in pipelines caused by the hydraulic jump	Open channel flow	Lecture + worked examples	Homework / quiz
3–4	6	Flow through free and submerged vents is calculated under different conditions and the flow is found over the furrows at a specific charge for rectangular dams and v-notch dams	Non-uniform flow in open channels	Lecture + problem solving	Homework / quiz
5–6	6	Define the specific energy, critical depth and calculation of the critical depth of the rectangular channel with the recognition of the different types of hydraulic control points	Classification of surface profiles in gradually varied flow	Lecture + tutorial	Homework / quiz
7–8	6	Flow is calculated through free and submerged vents under different conditions	Flow measurement and hydraulic control points	Lecture + numerical applications	Homework / quiz

9–10	6	Distinguishes between closed and open channels as well as understanding and analyzing expenses in open channels	Pressure surges “Water Hammer”	Lecture + worked examples	Homework / quiz
11–12	6	Recognizes common hydraulic applications in environmental engineering and applies the principles of hydraulics and fluid mechanics to the analysis of hydraulic facilities	Hydraulic similarity and flow similitude	Lecture + problem solving	Homework / assignment
13–14	6		Multiport diffuser outfalls	Lecture + discussion	Homework / quiz

Mid-term exam

Course Structure: Experimental

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
—	—	No laboratory component is assigned for this course.	Not applicable	—	—

11. Course Evaluation:

6 quizzes: 30 pts
 2 homework: 2 pts
 Attendance: 2 pts
 Report: 4 pts
 Class work: 2 pts
 Mid-term exam: 10 pts
 Final exam: 50 pts
 Total: 100 pts

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	No specific curricular textbook is assigned.
Main references (sources)	Larry D. Benfield, Treatment Plant Hydraulics for Environmental Engineers, Prentice Hall, New Jersey, 1984. Metcalf & Eddy, Wastewater Engineering: Collection and Pumping, McGraw-Hill, New York, 1981.
Recommended books and references (scientific journals, reports...)	Andrew Chadwick, John Morfitt and Martin Borthwick, Hydraulics in Civil and Environmental Engineering, Taylor & Francis Group, 2013.
Electronic References, Websites	Relevant scientific articles, hydraulic engineering references, and university e-learning resources.

Course Description Form

1. Course Name:					
Sewers networks					
2. Course Code:					
ENV322					
3. Semester / Year:					
Fall/ (2025-2026)					
4. Description Preparation Date:					
25/5/2026					
5. Available Attendance Forms:					
Class room					
6. Number of Credit Hours (Total) / Number of Units (Total):					
4 hours per week /6 units					
7. Course administrator's name (mention all, if more than one name):					
Dr. Layth Abdulaleem Mahmood Laythabdulaleem@uomosul.edu.iq					
8. Course Objectives:					
Course Objectives		1-Understanding how it can be followed the needed steps to supplement the procedures of analysis and design of sanitary and storm sewers networks. 2-Understanding when it is necessary to use the accessories of sanitary and storm sewers networks. 3-Appling the known open channel flow equation of fluid mechanics in the analysis and design of the sanitary and storm sewers networks. 4-For domestic plumbing system: defining the main components of water supply network, sanitary network, and storm network; and applying the accepted methods for the design of each one of them. 5-Learning analysis and design of sewers networks using SewerCAD software.			
9. Teaching and Learning Strategies:					
Strategy		The course will be covered by class room lectures; three hours each week for explaining the materials with giving examples, and one hour each week for tutorials problems. Explanation of necessary computer software will be given and a project on actual network will be submitted by one student.			
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Describes the primary and secondary components of sewer networks	Sewers networks: Components of sanitary sewage, Sewers networks types; Sewers design activities.	Classroom Lectures	Quizzes, Semester exam, Final exam, And project
2-4	12	Designs and follows engineering methods for sewer networks	Sanitary sewers network design		
5-6	8		Using SewerCAD software in analysis and design of sanitary sewers networks		
7-8	8	Learn the engineering methods used in the analysis of sewer networks	Minor and major drainage Systems of storm water, Estimating storm runoff: Rational method.		
9-10	8	Designs and follows engineering methods for sewer networks	Storm sewers networks design.		
11-12	8	Describes the primary and secondary components of sewer networks	Sewer Appurtenances: Manholes; Inverted siphon; outlets and outfalls; inlets, oil and sand traps		

13-15	12	Describes the primary and secondary components of sewer networks	Plumbing: Water supply network design; Sanitary drainage network design, storm network design.		
Course Structure: Experimental					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
11. Course Evaluation:					
8 Quizzes	25 pt				
Project	7 pt				
Seminar	4 pt				
Report	4 pt				
Mid exam	10 pt				
Final exam	50 pt				
Total	100 pt				
12. Learning and Teaching Resources:					
Required textbooks (curricular books, if any)					
Main references (sources)			1-McGhee, T. G., 1991, Water Supply and Sewerage 6th ed., McGraw-Hill, Inc. 2-Davis M. L., 2010, Water and wastewater engineering: design principles and practice. McGraw Hill Inc. 3-Larry W. M. (editor), 2001, Stormwater collection systems design handbook. McGraw-Hill Inc.		
Recommended books and references (scientific journals, reports...)			Michael F., 2002, Facility piping systems design handbook, McGraw-Hill Inc.		
Electronic References, Websites					

Course Description Form

1. Course Name:	
Noise pollution	
2. Course Code:	
ENV323	
3. Semester / Year:	
Spring/2025-2026	
4. Description Preparation Date:	
01-02-2026	
5. Available Attendance Forms:	
In-person lecture	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2hr /4 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Ammar Thamir Hamad, Email: dr.ammarthamir@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	Upon completion of this course, the student will be able to: CLO-1: Describe the physical characteristics of sound CLO-2: Identify different sources of noise pollution CLO-3: Apply the physical properties of sound waves to explain the mechanism of sound transmission in the air CLO-4: Preparing a Noise measurement report: Case study assignment CLO-5: Review environmental conditions affecting outdoor noise propagation CLO-6: Evaluate noise levels emitted from a highway and their compliance with regulations CLO-7: Design highway noise barriers to reduce traffic noise CLO-8: Compare different engineering concepts and principles used in noise control technologies.

9. Teaching and Learning Strategies	
Strategy	This course has several components that include power point lectures, individual & group assignments, case study report and e-learning platforms.

10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	Reviews the factors affecting the spread of noise in open spaces	Introduction: Properties of sound waves, sound power and intensity levels and the decibel, characterization of noise	Power point lecture, Video learning	Quiz
3-4	4		Rating systems the Ln concept, the Leq concept	Power point lecture, Case Study	Assignments, Report, Seminar
5-6	4		Effects of noise on people and criteria Hearing Impairment, Damage-Risk Criteria, Speech Interference, Annoyance, Sleep Interference Effects on Performance, Noise Standards	Power point lecture	Quizzes
7-11	10		Transmission of sound outdoors Inverse Square Law, Radiation Fields of a Sound Source Directivity, Airborne Transmission, Traffic noise prediction	Power point lecture, Group Discussion	Assignments, Quizzes

12-15	8	Compares Noise Control Techniques Designs an acoustic barrier to reduce noise levels generated by the transport and traffic sector, analyzes noise reduction methods and sound insulation for a variety of situations, assesses noise levels caused by a highway and its compliance with the parameters	Noise control Source-Path-Receiver Concept, Control of Noise Source by Design, Noise Control in the Transmission Path, Control of Noise Source by Redress, Protect the Receiver	Power point lecture	Quizzes
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11. Course Evaluation

5 quizzes	15 pts
5 Assignments	15 pts
Case study Report	5 pts
Seminar	5 pts
Mid-Term Exam	10 pts
Final Exam	50 pts
Total	100 pts

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Introduction to Environmental Engineering "Chapter -10" by Mackenzie Davis, 5th ed. (2013)
Main references (sources)	Engineering noise control, theory and practice by Bies and Hansen, 4th ed. (2009)
Recommended books and references (scientific journals, reports...)	User's guide traffic noise model 3.2, Federal Highway Administration office of Natural Environment, 2023.
Electronic References, Websites	https://www.fhwa.dot.gov/ENVIRONMENT/noise/
Percentage of curriculum update	5%

Course Description Form

1. Course Name:					
Soil Mechanics					
2. Course Code:					
ENV324					
3. Semester / Year:					
Spring/ 2025-2026					
4. Description Preparation Date:					
March 2025					
5. Available Attendance Forms:					
In class attending					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3hr. theory+ 3 hr. lab per week /6units					
7. Course administrator's name (mention all, if more than one name)					
Name: Dr. Mohammed Abdulnafaa, Email: mohammed1979eng@uomosul.edu.iq					
Name: Dr. Ayman W. Al-Dabbagh, Email: aymanwaleed1975@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		This course aims to introduce students to the category of soil mechanics, which is the application of the laws of mechanics and hydraulics to engineering problems dealing with sediments and other unconsolidated accumulations of solid particles resulting from the mechanical and chemical disintegration of rocks, regardless of whether or not they contain an organic component. This will be achieved through descriptive lectures.			
9. Teaching and Learning Strategies					
Strategy	6 educational outcomes, through strategies that are achieved in times equal to the number of weeks of study. CLO-1: Students will learn how to find an analysis of soil properties and solve some engineering properties of soil (i), CLO-2: Use soil properties to classify soils, calculate soil infiltration, compaction, shear strength, soil stabilization, and deal with other soil problems. (ii) CLO-3: Conduct appropriate measurements and tests of soil properties and analyze the results to obtain some values used in soil problems(iii), CLO-4: Students will be able to communicate and collaborate with others to conduct soil investigation reports. (v), CLO-5: Process and organize data obtained from selective soil topics presented and organized during the course. (vi), CLO-6: Form some opinions on emerging soil mechanics issues and try to provide some compatible solutions to the problems related to soil mechanics aspects (vii)				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Finds, classifies, and determines soil properties	Introduction	E-learning and in-person education	Exams and homework
2	3		Physical-mechanical properties of soil		
3	3		Soil classification		
4	3				
5	3	Calculate soil permeability and amount of water intrusion under dams	Hydraulic properties of soil		
6	3				
7	3				
8	3				
9	3	Specifies soil treatment methods	Soil improvement		
10	3	Calculates the amount of stresses that reach the soil from external loads	Stresses in soil		
11	3				
12	3	Calculates how much settlement occurs in the soil	Settlement in soil		
13	3				

14	3	Find the shear force that forms within soil	Shear stress in soil		
15	3	Finds and classifies soil properties	Soil investigation		
16	3		Preparing week for final foundation		

The Practical Side					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Performs appropriate measurements and tests of soil properties to make a soil inspection report	Introduction Index properties	in-person education	Practical report and exam
2	3		Specific gravity		
3	3		Atterbuge limits		
4	3		Soil classification		
5	3		Hydrometer test		
6	3		Permeability test		
7	3		Compaction test		
8	3		Filed density test Sand cone test		
9	3		Filed density test core cutter test		
10	3		Consolidation test		
11	3		Swelling test		
12	3		Shear test		
13	3		Unconfined compressive strength		
14	3		Soil chemical test		
15	3		General review of devices		
16	3		Practical exam		

11. Course Evaluation

Distribution of the grade out of 100 according to the tasks assigned to the student, such as daily preparation, daily, oral, monthly, written exams, reports, etc.

- 1- Daily exams (3): 20 marks
- 2- Assignments (1): 5 marks
- 3- Reports and practical exam (1): 15 marks
- 4- Semester exam (1): 10 marks
- 5- Final exam (1): 50 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	B.M. Das, principles of geotechnical engineering (2006)
Main references (sources)	B.M. Das, principles of geotechnical engineering (2014)
Recommended books and references (scientific journals, reports...)	د. يوسف الشكرجي, هندسة الأساس (2002)
Electronic References, Websites	Various websites concerned with the topic

Course Description Form

1. Course Name: Engineering Project Planning and Design					
Engineering Project Planning and Design					
2. Course Code:					
ENV325					
3. Semester / Year:					
Spring/ 2026					
4. Description Preparation Date:					
01/06/2026					
5. Available Attendance Forms:					
Face-to-face learning with the possibility of supporting activities through e-learning platform					
6. Number of Credit Hours (Total) / Number of Units (Total):					
2 hr. per week / 2units					
7. Course administrator's name (mention all, if more than one name):					
Musab Abduljabbar Abdulbaqi					
8. Course Objectives:					
The course aims to: - Introduce students to the concept, characteristics, and life cycle of engineering projects. - Enable students to identify engineering problems and formulate them scientifically. - Develop students' skills in scientific research, data collection, and information analysis. - Train students in conducting literature reviews and identifying research gaps. - Introduce the fundamentals of engineering project planning and preliminary feasibility studies. - Develop technical writing and scientific reporting skills. - Prepare students for the graduation project in the fourth year. - Enhance presentation and scientific discussion skills.					
9. Teaching and Learning Strategies:					
- Interactive lectures. - Classroom discussions. - Problem-Based Learning (PBL). - Project-Based Learning. - Individual and group assignments.					
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Understand the concept and importance of engineering projects	Introduction to Engineering Projects	Lecture & Discussion	Quiz
2	2	Identify project types and life cycle stages	Engineering Project Life Cycle	Lecture	Assignment
3	2	Formulate engineering problems scientifically	Project Topic Selection and Problem Definition	Lecture & Practice	Assignment
4	2	Identify reliable scientific information sources	Scientific Research and Information Sources	Lecture & Practice	Assignment
5	2	Conduct literature searches and reviews	Literature Review Fundamentals	Discussion & Practice	Assignment
6	2	Apply proper citation and referencing techniques	Citation and Referencing Methods	Practical Exercise	Quiz
7	2	Develop research objectives and identify research gaps	Research Problem and Objectives	Lecture	Assignment

8	2	Collect and classify engineering data	Engineering Data Collection and Analysis	Lecture	Quiz
9	2	Conduct preliminary project evaluation	Preliminary Feasibility Study	Case Study	Assignment
10	2	Develop project schedules	Project Scheduling and Planning	Practical Exercise	Assignment
11	2	Prepare engineering project reports	Technical Report Writing	Lecture	Assignment
12	2	Analyze and interpret project results	Results Analysis and Discussion	Discussion	Quiz
13	2	Develop professional presentation skills	Presentation Skills	Practical Exercise	Presentation
14	2	Defend engineering projects effectively	Project Presentation and Defense	Seminar	Oral Assessment
15	2	Review and integrate course knowledge	General Review	Discussion	Final Evaluation

11. Course Evaluation:

- Quizzes: 20%
- Home Works: 5%
- Class Works: 10%
- Assignments: 15%
- Midterm Examination: 10%
- Final Examination: 50%

(Total = 100%)

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Lecture notes prepared by the course instructor
Main references (sources)	<i>S. Ely, *Experimental Design and Technical Writing for Engineers*. University of Southern Indiana, 2025</i>
Recommended books and references (scientific journals, reports...)	S. Last, *Technical Writing Essentials: Introduction to Professional Communications in the Technical Fields*. BCcampus, 2018. [Online]. Available
Electronic References, Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/

Course Description Form

1. Course Name:					
Numerical Analysis					
2. Course Code:					
ENV326					
3. Semester / Year:					
Spring /2026					
4. Description Preparation Date:					
01/06/2026					
5. Available Attendance Forms:					
In class attendance					
6. Number of Credit Hours (Total) / Number of Units (Total):					
3 hr. per week / 3 units					
7. Course administrator's name (mention all, if more than one name):					
Dr. Salim Yousif Awad					
8. Course Objectives:					
Course Objectives: This course introduces students to fundamental numerical methods used to solve engineering and scientific problems that cannot be solved efficiently by analytical techniques. Students will learn numerical solutions for equations, systems of equations, interpolation, integration, and differential equations while assessing computational accuracy and errors. The course also develops skills in implementing numerical algorithms using modern computational tools for engineering applications.					
9. Teaching and Learning Strategies:					
Strategy		This course has several components, including lectures, individual & group assignments, and e-learning platforms. Exercises involving the use of computer application tools to understand specific unit processes. The course will be taught in English.			
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduces the basic concepts of numerical analysis	Introduction to Numerical Methods and Error Analysis	lecture	assignments
2	3		Accuracy, Round-off and Truncation Errors		
3	3	Develops mathematical problem-solving skills	Roots: Bisection and False Position Methods		
4	3		Roots: Newton-Raphson and Secant Methods		
5	3	Turns problems into math problems	Solve systems of equations (Gaussian Elimination)		QUIZ
6	3		Solve systems of equations Iterative Methods: Jacobi and Gauss-Seidel		assignments
7	3		Midterm Exam	exam	EXAM
8	3	Introduces the basic concepts of numerical analysis	Interpolation: Newton and Lagrange Methods	lecture	assignments

9	3	Turns problems into math problems	Curve Fitting and Regression Analysis	lecture	assignments
10	3	Develops mathematical problem-solving skills	numerical integration Trapezoidal and Simpson's Rules	lecture	QUIZ
11	3	Apply digital technologies using MATLAB/Excel software	Solve ODEs numerically Euler Methods	lecture	QUIZ
12	3		Numerical Methods Using MATLAB/Excels	lecture	assignments
13	3		Numerical Methods Using MATLAB/Excels	lecture	assignments
14	3	Analyzes errors and convergence of roads	Term project	lecture	REPORTS
15	3		Review	lecture	assignments
16	3		Final Preparation	exam	EXAM

Course Structure: Experimental: NONE

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

11. Course Evaluation:

	Time/Number	Weight (Marks)	Week Due
Formative assessment	Quizzes	4	30 % (40)
	Assignments	2	10 % (40)
	Projects / Lab.		
	Report		
Summative assessment	Midterm Exam	2hr	10% (10)
	Final Exam	3hr	50% (50)
Total assessment	100% (100 Marks)		

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	Applied Numerical Methods – Chapra
Main references (sources)	Numerical Analysis – Burden & Faires
Recommended books and references (scientific journals, reports...)	Wei-Chau Xie “Differential Equations for Engineers”, CAMBRIDGE UNIVERSITY PRESS, 2010
Electronic References, Websites	https://classroom.google.com/c/ODQzNjc3MzIxNTMz

Course Description Form

1. Course Name:					
Reinforced concrete					
2. Course Code:					
ENV327					
3. Semester / Year:					
Fall /2025-2026					
4. Description Preparation Date:					
2/9/2025					
5. Available Attendance Forms:					
Face-to-face at classroom setting					
6. Number of Credit Hours (Total) / Number of Units (Total):					
3 hr. per week / 4 units					
7. Course administrator's name (mention all, if more than one name):					
Name: Rana Burhan Abdullrahman, Email: rn.burha@uomosul.edu.iq					
8. Course Objectives:					
Course Objectives		To introduce students to the fundamental principles of reinforced concrete analysis and design. To develop students' understanding of the Working Stress Method and Ultimate Strength Method used in reinforced concrete design. To enable students to analyze and design reinforced concrete beams subjected to bending moments according to design requirements. To provide students with the knowledge and skills required to design shear reinforcement for reinforced concrete beams. To develop students' ability to analyze and design short reinforced concrete columns subjected to axial loads. To enable students to design reinforced concrete columns subjected to combined axial load and bending moments in accordance with structural design principles.			
9. Teaching and Learning Strategies:					
Strategy		This is an active, blended learning course that will require student to be engaged through the google classroom platform. This course is designed to stimulate learning through participation of students consider key questions that need to be answered to understand a given topic			
10. Course Structure: Theoretical					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	To introduce students to the fundamental principles of reinforced concrete analysis and design.	Introduction	blend of online learning lectures with face-to-face instructions/ discussions of lectures.	Quiz & H. W
2-4	9	To develop students' understanding of the Working Stress Method used in reinforced concrete design.	Flexural Analysis of Beams (working stress method)		
5-8	12	To develop students' understanding of the Ultimate Strength Method used in reinforced concrete design.	Flexural Analysis of Beams (Ultimate) According to ACI Code.		

9-10	6	To provide students with the knowledge and skills required to design shear reinforcement for reinforced concrete beams.	Shear Stresses in Concrete Beams; Design for Shear.		
11-15	15	To develop students' ability to analyze and design short reinforced concrete columns subjected to axial loads and enable students to design reinforced concrete columns subjected to combined axial load and bending moments in accordance with structural design principles.	Columns: Design of Short Columns Subject to Axial Load and Bending		

11.

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

12. Course Evaluation:

5 Home work: 5 pts
5 Quizzes: 30 pts
Report: 5 pts
Mid exam: 10 pts
Final exam: 50 pts

13. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	
Main references (sources)	Nilson A., Darwin D. , Dolan C. (2004) "DESIGN OF CONCRETE STRUCTURES ", 30th ed. , McGraw Higher Education , USA
Recommended books and references (scientific journals, reports...)	Aghayere, A. O., Limbrunner, George F. (2014) "DES OF REINFORCED CONCRETE"8th ed. Library Congress, USA.
Electronic References, Websites	https://www.youtube.com/watch?v=lyg_a8NVEzY

Course Description
Environmental Engineering
Department
College of Engineering
University of Mosul
Fourth Year / Course System

Fourth Level				
Fall Semester				
Course Code	Course	Theoretical hours	Practical hours	Credit Units
ENG425	Engineering management	2	-	2
ENG436	Environmental engineering and Sustainable	2	-	2
ENV440	Drinking water treatment	4	-	4
ENV441	Wastewater treatment design	4	-	4
ENV442	Environmental construction design	3	-	3
ENV443	Air pollution control	3	-	3
ENV444	Graduation Project I	2	-	2
Total		20	-	20

Fourth Level				
Spring Semester				
Course Code	Course	Theoretical hours	Practical hours	Credit Units
UOM	English language-Advanced	2	-	2
ENG426	Engineering economic	2	-	2
ENV445	Industrial and hazardous wastewater	4	-	4
ENV446	Soil and ground water pollution	3	-	3
ENV447	Construction drawing	2	-	2
ENV448	Estimation	2	-	2
ENV449	Graduation Project	2	-	2
ENV490	Advance water supply /	2	-	2
ENV491	Advanced wastewater treatment			
Total		19	-	19

Course Description Form

1. Course Name:	
Wastewater treatment plants design	
2. Course Code:	
ENV441	
3. Semester / Year:	
Fall/ 2024–2025	
4. Description Preparation Date:	
10–9–2024	
5. Available Attendance Forms:	
In person lecture	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4/4	
7. Course administrator's name (mention all, if more than one name)	
Name: Ammar Thamir Hamad	
Email: dr.ammarthamir@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	- Recognize the common physical, chemical and biological unit operations encountered in treatment processes (i) - Apply the basic concepts of sciences and engineering to solve issues associated with the treatment of wastewater (i) - Formulate a preliminary design of wastewater treatment plant including preliminary, primary, secondary, and tertiary treatment units (ii) - Develop and solve design problems and analyze the data to evaluate the feasibility of a components of the wastewater treatment plant (ii). - Report the data obtained from the site visits to WWTP that will be organized during the course (iv) - Demonstrate the ability to lead and productively participate in group situations via assigning multidisciplinary design projects for specific wastewater unit processes (vii)
9. Teaching and Learning Strategies	

Strategy		This course has several components that include power point lectures, individual & group assignments, field visits and e-learning platforms. Exercises involving the use of computer applications tools to understand specific unit processes.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Recognize the common physical, chemical and biological unit operations encountered in treatment processes	Introduction, objectives, general consideration of wastewater treatment plant planning and design	Power point lecture	Quiz
2-3	8	Formulate a design of coarse screen and collection pit	Preliminary unit operation: Screening and collection pit	Power point lecture	Individual Assignments + Quiz
4	4	Formulate a design of grit chamber	Design of Grit chamber facilities	Power point lecture	Individual Assignments
5	4	Formulate a design of PST	Primary unit operation (PST) Design	Power point lecture	Individual Assignments + Quiz
6-7	8	Recognize the common unit process of biological treatment	Fundamentals of biological treatment	Site visit	Report
8-11	12	Formulate a design of activated sludge units	Design of suspended growth units: Activated sludge processes and modifications	Power point lecture	Individual Assignments + Quiz
12	4	Recognize the common features of trickling filter	Attached Growth systems: Trickling filter,	Power point lecture	Quiz
13	4	Recognize the common features of Simplified Systems of waste water Treatment:	Simplified Systems of waste water Treatment: Aerated lagoons, Stabilization ponds	e-learning platforms	Quiz
14-15	8	Formulate a design of grit chamber	Design of disinfection units: Chlorination, Ozonation, UV disinfection	Power point lecture	Group assignments
11. Course Evaluation					
5 quizzes		10 pts			
5 homework		10 pts			
Term Exam		20 pts			
Final Exam		60 pts			
Total		100 pts			
12. Learning and Teaching Resources					

Required textbooks (curricular books, if any)	Metcalf and Eddy "Wastewater engineering, treatment and resource recovery", McGraw hill, New York, 2014
Main references (sources)	S. Qasim and G. Zhu "Wastewater Treatment and Reuse Theory and Design Examples Volume 1: Principles and Basic Treatment" , Taylor & Francis Group, 2018
Recommended books and references (scientific journals, reports...)	Karia, G.I. and Christian, R.A. "Wastewater treatment, concept and design approach", Prentice Hall of India, New Delhi, 2006.
Electronic References, Websites	https://4enveng.com/

Course Description Form

1. Course Name:					
English language- Upper Intermediate					
2. Course Code:					
3. Semester / Year:					
2024-2025					
4. Description Preparation Date:					
12/09/2024					
5. Available Attendance Forms:					
In person lectures					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2/2					
7. Course administrator's name (mention all, if more than one name)					
Name: Samir Yasso, Ph.D. Email: syasso@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		Providing the student with the required skills to write a technical reports, essays, and professional emails. Practicing reading and writing.			
9. Teaching and Learning Strategies					
Strategy		This course has several components that include lectures, individual assignments, and e-learning platforms. All mandatory assignments have to be submitted within the deadlines to be admitted to the exams.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	iv	English grammar- a general overview	In class presentations	HWs, exams
2			Parts of speech + level I reading		
3			Types of sentences in English + level I reading		
4			Comparative degrees		
5			Tenses in English		
6			Tenses (cont.) + level II reading		
7			If-clause + level II reading		
8			Active and passive voice		
9			Prepositions+ level III reading		
10			Level III reading		
			Parallelism		
11			How to write a technical report		
12			How to write a professional email		
13			Practicing writing technical report		
14			Practicing writing professional email		
15					

11. Course Evaluation

Three quizzes, (each 3pt)	9 pts
Five homeworks (each 3pt)	15 pts
1st term Exam	8 pts
2nd term Exam	8 pts
Final Exam	60 pts

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	What a life Stories of amazing people by Milada Broukal. What a World 1. Amazing Stories from Around the Globe by Milada Broukal. What a World 2. Amazing Stories from Around the Globe by Milada Broukal.
Main references (sources)	Lecture notes
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	
13. Update percentage	5%

Course Description Form

1. Course Name:					
Environmental structural design					
2. Course Code:					
ENV442					
3. Semester / Year:					
2024-2025					
4. Description Preparation Date:					
15/09/2024					
5. Available Attendance Forms:					
Inperson lectures					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3/3					
7. Course administrator's name (mention all, if more than one name)					
Name: Samir Yasso, Ph.D. Email: syasso@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		An introduction to the reinforced concrete structure, Characteristics of reinforced concrete elements, Concrete types, Steel Grades, and Loading types. Design of different structural elements subjected to flexure and shear using load and resistance factor design method (LRFD). Design of continuous one-way slabs and beams using ACI coefficients method. Design of two-way slabs using the coefficients method. Staircase analysis and design. Foundation types and analysis and design of wall and spread footings. Structural design of liquid retaining structures using PCA method, and the design of reinforced concrete retaining Walls. The topics will be covered according to the American Building Code.			
9. Teaching and Learning Strategies					
Strategy		This course has several components that include lectures, individual assignments, field visits- when possible and e-learning platforms. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	3	i, ii	Introduction to concrete structures, materials, design codes, and design loads.	In class presentations	HWs, exams
2			Loads on structures and design methodology.		
3			Introduction to ACI coefficient method for analysis of continuous one-way slabs and beams.		
4			Analysis and design of continuous one-way slabs.		
5			Analysis and design of continuous one-way slabs-Cont.		
6			Analysis and design of continuous beams.		
7			Introduction to analysis and design of two-way slabs using the ACI coefficient method.		
8			Analysis and design of two-way slabs-Cont.		
9			Introduction to footings.		
10			Analysis and design of wall and spread footing.		
11			Introduction to retaining walls.		
12			Analysis and design of cantilever retaining walls.		
13			Introduction to liquid retaining structures.		
14			Analysis and design of liquid retaining structures using PCA method.		
15			Analysis and design of liquid retaining structures using PCA method- cont.		

11. Course Evaluation

Two quizzes, (4 pts each)	8 pts
Four HWs (3 pts each)	12 pts
1st term Exam	10 pts
2nd term Exam	10 pts
Final Exam	60 pts

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Design of Reinforced Concrete, Jack McCormac and Russell Brown, 10 th edition.
Main references (sources)	Design of Concrete Structures by Nilson, Darwin, and Dolan, 14 th edition.
Recommended books and references (scientific journals, reports...)	ACI 318-14M, Building Code Requirements 2014, American Concrete Institute.

	ACI 318-63, Building Code Requirements 1963, American Concrete Institute. ASCE 7-10, Minimum Design Loads for Buildings and Other Structures. ACI 350, Code Requirements for Environmental Engineering Concrete Structures, American Concrete Institute. PCA Tables for the design of concrete liquid retaining structures.
Electronic References, Websites	www.concrete.org
13. Update percentage	5%

Course Description Form

1. Course Name:					
Structural drawings					
2. Course Code:					
ENV447					
3. Semester / Year:					
2024-2025					
4. Description Preparation Date:					
15/09/2024					
5. Available Attendance Forms:					
Inperson lectures and labs					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3/3					
7. Course administrator's name (mention all, if more than one name)					
Name: Samir Yasso, Ph.D. Email: syasso@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		An introduction to the structural drawings, drawings scales, drawings types, layouts, fonts and lines types, and dimensioning. Converting the designs to technical drawings drawings that can be used by site engineers and contractors. The technical drawings of different structural members like beams, slabs, footings, etc. The use of AutoCAD to produce technical drawings to meet the standards at the jobsite.			
9. Teaching and Learning Strategies					
Strategy		This course has several components that include lectures, individual assignments, field visits- when possible and e-learning platforms. The course will be taught in English, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	3	i, ii	Introduction to structural drawings.	In class presentations	HWs, exams
2			Plans details and symbols		classwork
3			Utilizing AutoCAD in structural drawings.		
4			Structural Drawings: Plans		
5			Structural Drawings: Slabs		
6			Structural Drawings: Slabs- cont.		
7			Exam		
8			Structural Drawings: Beams		
9			Structural Drawings: Beams- cont.		
10			Structural Drawings: Columns		
11			Structural Drawings: Spread footings		
12			Structural Drawings: Wall footings		
13			Exam		
14			Selected topics		
15			Selected topics		

11. Course Evaluation

Four quizzes, (each 3pts)	12 pts
Homework, (each 2pts)	8 pts
1st term Exam	10 pts
2nd term Exam	10 pts
Final Exam	60 pts

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	ACI Detailing manual, 2020.
Main references (sources)	Lecture notes
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	www.concrete.org
13. Update percentage	5%

Course Description Form

1. Course Name:	
Engineering Management	
2. Course Code:	
ENGC425	
3. Semester / Year:	
Fall/2024	
4. Description Preparation Date:	
13 th -9-2024	
5. Available Attendance Forms:	
In-Class	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2/2	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr.Anas F. Qaid Dr.Hamid A. Al-Khashab Email: anasfq@uomosul.edu.iq hamidalkhashab@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	1. Listing and recognizing project activities and critical paths. 2. Understanding the principles of project management and the construction works stages. 3. Using Microsoft Project software to schedule the project activities and levelling the resources. 4. Integrating the time and cost of the project. 5. Judging the project efficiency depending on time and budget. 6. Planning and tracking the project.
9. Teaching and Learning Strategies	
Strategy	The course will focus on in-class learning with 3 hours per week. The ability of student will be measured by quizzes, report, midterm and final exams.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
2	4	1	• Introduction to project management and management levels • The stages of the construction project. The role and responsibilities of the parties of the construction project	In-Class	Paper Base Test
3	6	1	• Project time planning - Critical path method • Bar charts • Arrow Network charts • Precedence and time-share schemes	In-Class	Paper Base Test
0.5	1		Quiz	In-Class	Paper Base Test
3	6	2	MS Project software	In-Class	Paper Base Test
1	2		Midterm Exam	In-Class	Paper Base Test
3	6	1	• Resources allocating and levelling • Work progress Calculation: Progress (S) curve,	In-Class	Paper Base Test
2	4	1	The earned value method	In-Class	Paper Base Test
1	2	1	Final	In-Class	Paper Base Test

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student

Quizzes 12%

Project 8%

Midterm 20%

Final 60%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• K. K. Chitkara “Construction Project Management 3rd Edition, Kindle Edition” Mc Graw Hill education , INDIA, 2014. • S. Seetharaman" Construction Engineering and Management fifth edition", UMESH publications, 2015.
Main references (sources)	Lectures
Recommended books and references (scientific journals, reports...)	Lectures
Electronic References, Websites	NA

Course Description Form

1. Course Name:	
Industrial and Hazardous Wastewater	
2. Course Code:	
ENEV 445	
3. Semester / Year:	
Fall/2024	
4. Description Preparation Date:	
13 th -9-2024	
5. Available Attendance Forms:	
In-Class	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4/4	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr.Hamid A. Al-Khashab Email: hamidalkhashab@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	1. Define the characteristics of industrial wastewater, manufacturing processes, and management strategies for pollution prevention and waste minimization. 2. In-plant survey; Identifying wastewater generating operations. 3. Preparing mass balance, calculations for industrial operations, In-plant control; Industrial water conserving and recycling. 4. The course will cover Industrial wastewater treatment technologies (Equalization, Floatation, Neutralization, Microfiltration), Studying of selected wastewater industries and wastewater treatment: Physical units.
9. Teaching and Learning Strategies	
Strategy	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved

		through classes, interactive tutorials and by considering type of sim experiments involving some sampling activities that are interesting to students.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	1	Introduction, Characteristics of industrial wastewater	In-Class	Paper B Teat
2	4	1	In-plant survey; Identifying wastewater generating operations; Preparing mass balance calculations for industrial operations	In-Class	Paper B Teat
3	4	2	In-plant survey; Identifying wastewater generating operations; Preparing mass balance calculations for industrial operations	In-Class	Paper B Teat
4	4	2	In-plant control; Volume and strength reduction	In-Class	Paper B Teat
5	4		Life Cycle Assessment (LCA)	In-Class	Paper B Teat
6	4	1	Industrial wastewater treatment technologies: Neutralization	In-Class	Paper B Teat
7	4	1	Industrial wastewater treatment technologies: equalization	In-Class	Paper B Teat

8	4	1	Industrial wastewater treatment technologies: Flotation	In-Class	Paper B Teat
9	4	1	Midterm	In-Class	Paper B Teat
10	4	1	Studying of selected wastewater industries: Dairy industry	In-Class	Paper B Teat
11	4	1	Studying of selected wastewater industries: Textile industry	In-Class	Paper B Teat
12	4	1	Studying of selected wastewater industries: Slaughterhouses; Tannery industry	In-Class	Paper B Teat
13	4	1	Sources of pollutants in petroleum industry, refineries quantity and characteristics	In-Class	Paper B Teat
14	4	1	Sources of pollutants in petroleum industry, refineries quantity and characteristics	In-Class	Paper B Teat
15	4	1, 2	Energy in wastewater and its sustainability	In-Class	Paper B Teat

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student

Quizzes 12%

Project 8%

Midterm 20%

Final 60%

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	- Nemerow L. N., " Industrial Waste Treatment", Elsevier Science & Technology Books, Netherlands, 2006 - Eckenfelder W.W "Industrial pollution control, Mc Graw Hill Int. 3rd Ed.,2000.
Main references (sources)	Lectures
Recommended books and references (scientific journals, reports...)	Lectures
Electronic References, Websites	https://meet.google.com/uwg-wruc-cqg

Course Description Form

1. Course Name:					
Air pollution control					
2. Course Code:					
ENV443					
3. Semester / Year:					
Fall/2024-2025					
4. Description Preparation Date:					
15/10/2024					
5. Available Attendance Forms:					
In Classroom- google classroom					
6. Number of Credit Hours (Total) / Number of Units (Total)					
3/3					
7. Course administrator's name (mention all, if more than one name)					
Name: Dr. Mohammed Salim Shihab Email: shihab77@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		•Apply the basic principles of sciences and engineering to solve issues associated with air pollution basics and control. (i) •Knowing the air pollution control techniques and types; (i, vii) •Apply the control practices and devices according to the types of pollutants;(ii) •Understand the design procedures for controlling any type of air pollutants.(ii)			
9. Teaching and Learning Strategies					
Strategy		Lecture notes, PowerPoint presentations, Videos, project,			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	i	Classification of air pollution control equipment.	Lecture notes PowerPoint	Quizzes and Home Works
2-3-4-5	12	i,vii	Particles separation technique (gravity chamber, centrifugal	Lecture notes PowerPoints videos	Quizzes Home Works

			separators (cyclones), filter baghouse, electrostatics precipitators.		
6-7-8-9	12	ii	Gaseous pollutants control technique (wet scrubber(Venture scrubbers)), Absorption, Adsorption.	Lecture notes PowerPoints	Quizzes Home Works
10-11-12	9	ii	DeSOx) Flue Gas Desulfurization	Lecture notes PowerPoints	Quizzes Home Works
13-14-15	9	ii	Control Technologies for Nitrogen Oxides (DeNOx)	Lecture notes PowerPoints	Quizzes Home Works Midterm exam

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

Quizzes	8pt
homework	4pt
Project	8pt
semester term Exam	20pt
Final Exam	60pt
Total	100pt

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Mackenzie A. Davis, Davis A. Cornwel , Introduction to Environmental Engineering ,Chapter (9) , Air pollution ,6th ed. McGraw-Hill, ISBN 978-007-125922-4, 2023.

	• Masters, GM, Introduction to Environmental Engineering and Science, Chapter (7) , Air pollution, 3rd ed. Prentice Hall, ISBN 0 – 13 – 155384 – 4,2014. • Wark, K, Warner, CF and Davis, WT, Air Pollution – its origin and control. Addison-Wesley ISBN 0- 673-99416-3, 1998.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:					
Drinking Water Treatment					
2. Course Code:					
ENV440					
3. Semester / Year:					
Spring/ 2024-2025					
4. Description Preparation Date:					
24-9-2024					
5. Available Attendance Forms:					
In Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
4 hours per week/ 4 units					
7. Course administrator's name (mention all, if more than one name)					
Name: Abdulmuhsin S. Shihab					
Email: mss_qzz@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			Water supply engineering deals with physical and chemical treatment of water, the subjects of this course focus on main conventional Water Supply Treatment Plant (WSTP) units their description and design. These units include intake, coagulation and flocculation, sedimentation, filtration and disinfection. The student when complete this course will have a wide idea for analyses and design of the main water supply treatment units.		
9. Teaching and Learning Strategies					
Strategy		The students will be prepared to achieve the objectives by class lectures and, the evaluation will take place with home works, daily, termly and course examinations			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	The students should be familiar with the stages of drinking water treatment plant in terms of design and operation	Summary of water quality	Class Lectures	Home Works, Quizzes, terms and course examinations
2	4		Water quantity and water conservations		
3	4		Water treatment processes		
4-5	8		Intake		
6	4		Coagulation and flocculation theory		
7	4		Coagulation and flocculation geometry		
8-9	8		Sedimentation theory, type of sedimentation, sedimentation basins design		
10-12	12		Filtration theory and filtration mechanisms, type of filter and filtration, back washing, filtration basins, design criteria		
13-15	12		Disinfection; type of disinfections, chlorination, ozonation, UV		

11.Course Evaluation	
Activity	Points
Daily examinations	13
Home works	2
Terms examinations	25
Final examination	60
12.Learning and Teaching Resources	
Required textbooks	Qasim, S. R, Motley, E. M. and Zhu, G., (2010). "Water works engineering planning, design and operation", Prentice Hall PTR.
Main references	Davis, M. L., (2010). "Water and wastewater engineering, design principles and practice", McGraw- Hill, Inc., 1300p.
Recommended books and references (scientific journals, reports...)	Crittenden, J. C., Trussell, R. R., Hand, D. W., Howe, K. J., & Tchobanoglous, G. (2012). <i>MWH's water treatment: principles and design</i> . John Wiley & Sons.
Electronic References, Websites	

Course Description

1. Course Name:	
Engineering Economic	
2. Course Code:	
ENGC426	
3. Semester / Year:	
Second Semester / 2024/2025	
4. Description Preparation Date:	
19 / 04 / 2025	
5. Available Attendance Forms:	
Theoretical Lecturers and Tutorials	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hours / 2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Rakan Farooq Qasim Email: Ra_fa99@yahoo.com	
8. Course Objectives	
Course Objectives	1- ntroducing the student to the importance studying the engineering economics course 2- Introducing the student to the importar of controlling costs Engineering projects. 3- Training students to conduct econon studies Comparisons and alternatives.
9. Teaching and Learning Strategies	
Strategy	Theoretical , Practical , Tutorial and Field lecturers
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Learning	General concepts of engineering economics and sustainability	Learning and discussion	Discussion
2,3,4	2 for each week	Learning and solving problems	Costs, annual cost bonus and inflation	Learning and discussion	Discussion and homework
5,6	2 for each week	Learning and solving problems	Compound interest and economic relations	Learning and discussion	Discussion and homework
7,8	2 for each week	Learning and solving problems	Analysis of cash flow and time value of capital	Learning and discussion	Discussion and homework
9,10,11	2 for each week	Learning and solving problems	Comparisons and alternatives - present value - future value - internal rate of return	Learning and discussion	Home works
12,13	2 for each week	Learning and solving problems	Consumption - ways to find extinction	Learning and discussion	Home works
14,15	2 for each week	Learning	Economic feasibility of projects and sensitivity analysis	Learning and discussion	Discussion and homework

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc.

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Engineering economics
Main references (sources)	Project Evaluation

Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:					
Soil and ground water Pollution					
2. Course Code:					
ENV446					
3. Semester / Year:					
(Spring semester) / 2024-2025					
4. Description Preparation Date:					
24/9/2024					
5. Available Attendance Forms:					
In Class					
6. Number of Credit Hours (Total) / Number of Units (Total):					
3/3					
7. Course administrator's name (mention all, if more than one name)					
Name: Dr. Anas Fakhry Qassid Email: anasfq@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		- Explain the main scientific and engineering principles of soil and groundwater remediation; - Explain the legal, planning and environmental health issues in relation to redevelopment of contaminated sites; - Design and plan a remediation of polluted soils; - Complete a risk analysis of a contaminated site;			
9. Teaching and Learning Strategies					
Strategy		This course has several components that include lectures, assignments, exercises and introduce a report for soil pollution analysis for each student group. The course will be taught in Arabic, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.			
10. Course Structure					
Week (Numbers)	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	G.O.1	Environmental Pollution, Environmental Pollutants	In Class	Quizzes Homework Semester Exam Report Final Exam
1	3	G.O.1	The Origin of Soil, Soil constituents, Soil Properties, and Soil Types and Classification		
2	6	G.O.1	Basic Environmental Chemistry		

1	3	G.O.1	Soil Pollution, Sources, causes and effects		
2	6	G.O.1	Behavior of substances in Soil		
2	6	G.O.1	Soil Analysis		
1	3	G.O.2	Soil remediation		
1	3	G.O.2	Mass transport processes, and Flick's law		
2	6	G.O.2	Application of 1-D and 2-D flow and mass transport to groundwater contamination problems		

11. Course Evaluation

5 quizzes	10pt	
2 homework	2pt	
Term Exam	20pt	
Report	8pt	
Final Exam	60pt	
Total	100pt	

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Marcel van der Perk "Soil and Water Contamination", The M.C. Eschers company, 2006
Main references (sources)	Simone Pascucci, " Soil Contamination ", Janeza Trdine 9, 51000 Rijeka, Croatia, 2011
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Sustainable Environmental Engineering	
2. Course Code:	
ENGE436	
3. Semester / Year:	
Fall / 2024-2025	
4. Description Preparation Date:	
01/10/2024	
5. Available Attendance Forms:	
In person and electronic (Google Classroom - lpxnyx7)	
6. Number of Credit Hours (Total) / Number of Units (Total):	
2 / 2	
7. Course administrator's name (mention all, if more than one name):	
Name: Dr. Omar M. Abdulkareem, Email: omaralhakeem@uomosul.edu.iq	
Name: Taha A. Al-tayyar, Email: ta_tayyar@uomosul.edu.iq	
8. Course Objectives:	
Course Objectives	- Learn about the principles, indicators and general concept of sustainability; - Get a useful acquaintance about the features of sustainable concrete in accordance with the sustainable concept through identifying the ecological impacts of cement and concrete production, - Apprehend the local, regional and global impacts of unsustainable designs, products and processes; - Explore the types of new and renewable energies, and have in-depth knowledge about the eutrophication; - Your ability to use the mathematical and the scientific principles with the sustainability concepts in engineering.
9. Teaching and Learning Strategies:	
Strategy	Power Point Presentations
10. Course Structure:	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1 & 2	4	Learn about the principles, indicators and general concept of sustainability	Sustainable development, Conceptions, Development & applications	Presentation	-
3 & 4	4	Explore the types of new and renewable energies	Renewable Energy, New and renewable energy, Sun energy, Wind energy, Waterfalls energy, etc., Applications, How to use	Presentation	Quiz 1
5	2	Have in-depth knowledge about the eutrophication	Eutrophication in surface water, Types of algae, causes, their results on water quality, treatment plants, modeling of nutrients cycles	Presentation	Report 1
6 & 7	4	Get a useful acquaintance about the features of sustainable concrete in accordance with the sustainable concept through identifying the ecological impacts of cement and concrete production	Sustainability of concrete: Introduction, Negative environmental effects of cement and concrete industries, Environmental concerns, Ten qualifications of concrete sustainability	Presentation	Quiz 2
8 & 9	4	Apprehend the local, regional and global impacts of unsustainable designs, products and processes	Environmental impacts of Portland cement production: Introduction, Description of cement production process, Main impacts, Environmental sustainability, Social sustainability, Economic sustainability, Future trends.	Presentation	Report 2
10	2	Able to use the mathematical and the scientific principles with the sustainability concepts in engineering	Environmental impacts of cement manufacture – Mathematical calculations	Presentation	Monthly Exam 1
		Get a useful acquaintance about	Sustainable ready mix plant-Case study:		

11	2	the features of sustainable concrete in accordance with the sustainable concept through identifying the ecological impacts of cement and concrete production	Introduction, Transportation of materials, Example of sustainable ready-mix plant, Conclusion.	Presentation	Quiz 3 + Report 3
12 & 13	4	Get a useful acquaintance about the sustainable concept through identifying the ecological impacts of cement and concrete production	Noise control in the cement manufacture: Introduction, Sources of noise in cement works, Harm of noise in cement plant, Basic principles of noise control, Noise abatement in cement plant.	Presentation	Monthly Exam 2 + Report 4
14 & 15	4	Get a useful acquaintance about the features of sustainable concrete	Concrete with construction and demolition wastes (CWD): Introduction, Construction & demolition wastes uses, Construction & demolition wastes sources, Construction & demolition wastes classification, Construction & demolition wastes composition, Construction & demolition wastes management, Construction & demolition wastes reuses.	Presentation	Quiz 4

Final Exam

11. Course Evaluation:

4 Daily Exams (16) + 2 Monthly Exams (14) + 4 Reports (10) + Final Exam (60)

12. Learning and Teaching Resources:

Required textbooks (curricular books, if any)	None
Main references (sources)	● P-C, Aïtcin and S. Mindess, Sustainability of concrete - Modern concrete technology series 17, 1st edition, Spon Press, Taylor & Francis Group, 2011. ● G. M. Sabnis, Green building with concrete- Sustainable design and

	construction, CRC Press, Taylor & Francis Group, 2012. ● F. Pacheco-Torgal, S. Jalali, J. Labrincha and V. M. John, Eco-efficient concrete, Woodhead publishing limited, 2013. ● K. E. Peray, Cement manufacture' s handbook, Chemical publishing Co., Inc., 1979. ● M. Davis and S. Masten, Principles of environmental engineering and science, McGraw-Hill, Inc., 2004.
Recommended books and references (scientific journals, reports...)	None
Electronic References, Websites	None

Course Description Form

1. Course Name:					
Advanced Drinking Water Treatment					
2. Course Code:					
ENV490					
3. Semester / Year:					
Fall/ 2024-2025					
4. Description Preparation Date:					
10-9-2024					
5. Available Attendance Forms:					
In person lecture					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2/2					
7. Course administrator's name (mention all, if more than one name)					
Name: Abdullah Ismael Ibrahim					
Email: abdullah.ibrahim@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			- Recognize the common physical and chemical units operations encountered in treatment processes (i) - Apply the basic concepts of sciences and engineering to solve issues associated with the advanced water treatment (i) - Formulate a preliminary design of advanced water treatment (ii) - Develop and solve design problems and analyze the data to evaluate the feasibility of a components of the water treatment process (ii).		
9. Teaching and Learning Strategies					
Strategy	Students will be prepared to achieve the objectives of class. Evaluation of student will be performed relying on home works, daily, and mid term exams.				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	4	i & ii	Chemical precipitation	Class Lectures	home work,
3-4	4	i & ii	Ion exchange		

5-7	6	i & ii	Reverse Osmosis		daily, termly and course examinatio ns
8-9	4	ii	Electrical dialazes		
10-15	12	ii	Drinking Water Treatment plant residual management		

11. Course Evaluation

5 quizzes	10 pts
5 homework	10 pts
Term Exam	20 pts
Final Exam	60 pts
Total	100 pts

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Davis, M. L., (2010). "Water and wastewater engineering, design principles and practice", McGraw- Hill, Inc., 1300p.
Main references (sources)	Qasim, S. R, Motley, E. M. and Zhu, G., (2010). "Water works engineering planning, design and operation", Prentice Hall PTR.
Recommended books and references (scientific journals, reports...)	Crittenden, J. C., Trussell, R. R., Hand, D. W., Howe, K. J., & Tchobanoglous, G. (2012). <i>MWH's water treatment: principles and design</i> . John Wiley & Sons.
Electronic References, Websites	

Course Description Form

1. Course Name:					
Estimation					
2. Course Code:					
ENV448					
3. Semester / Year:					
2024-2025					
4. Description Preparation Date:					
10-9-2024					
5. Available Attendance Forms:					
In Class					
6. Number of Credit Hours (Total) / Number of Units (Total)					
2/2					
7. Course administrator's name (mention all, if more than one name)					
Name: Dr. Kaythar A. Ibrahim Email: kaythar6871@uomosul.edu.iq Name: Ahamd Yaseen Shehab					
8. Course Objectives					
Course Objectives		- Identifying the measuring units of the different types of quantities items. - Using engineering formulas to calculate the quantities of materials used in construction. - Detect the estimated prices of the construction projects.			
9. Teaching and Learning Strategies					
Strategy		This course has several components that include classes & lectures, exams. The course will be taught in Arabic.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	i	Introduction to estimation	Power point+ whiteboard+ discussion	Homework
2	2	ii	Areas & Volumes, Detailed Estimation & Rough Estimation.	Power point+ whiteboard+ discussion	Quiz
3 & 4	4	ii	Soil Excavation	Power point+ whiteboard+ discussion	Exam

5&6	4	i+ii	Measuring of concrete volume & composition according to mix design	Power point+ whiteboard+ discussion	Homework
7&8	4	ii	Measuring of blockwork & stonework.	Power point+ whiteboard+ discussion	Quiz
9&10	4	ii	Quantities calculation of concrete reinforcement steel	Power point+ whiteboard+ discussion	Homework
11	2		Mid-term exam		
12	2	i+ii	Measuring of construction finishing	Power point+ whiteboard+ discussion	Quiz
13	2	i+ii	Pricing and Cost Analysis:	Power point+ whiteboard+ discussion	Exam
14	2	i	Bill of quantity	Power point+ whiteboard+ discussion	Exam
15	2	i	Contract Specification & Conditions	Power point+ whiteboard+ discussion	Exam

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports etc

HomeWorks: 20 marks

Quizzes: 30 marks

Exams: 50 marks

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	B. N. Dutta, "Estimation and Costing in Civil Engineering- Theory and Practice" Twenty-Eight Revised Edition, UBS Publishers, INDIA, 2012.
Recommended books and references (scientific journals, reports...)	Martin Brook, " Estimating and Tendering for Construction Work ", ELSEVIER, Third Edition, 2004.
Electronic References, Websites	