

**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

2025

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, 2025

File Completion Date: April, 2025

Signature: 

Head of Department Name:

Assist. Prof. Dr. Abdullah T. Ibrahim

Date: 6/4/2025

Signature: 

Scientific Associate Name:

Assist. Prof. Dr. Ayman Talib Hamad

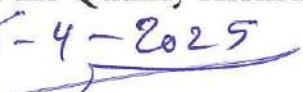
Date: 6-4-2025

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date: 6-4-2025

Signature: 

Dr. Abdulrahman Hani Taha



Approval of the Dean

أ.م.د. عبد المجيد محمد حمزة
عميد كلية الهندسة

1. Program Vision

Leadership and excellence in environmental engineering in education, research, and application

2. Program Mission

Consolidating the role of environmental engineering in community, raising the level of the graduate and developing his ability to compete in the labor market with high professionalism and employing it in achieving comprehensive and sustainable development

3. Program Objectives

- 1-Our graduates will perceive engineering knowledge and skills that help them to advance their career in the field of environmental engineering
- 2-Our graduates will establish themselves as practicing engineers in the field of environmental engineering, civil engineering and other related domains
- 3-Our graduate will be provided by creative knowledge to fulfill the need of society

4. Program Accreditation

The Program is under review by the National 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	37	104	71.7	
Summer Training	1			
Other				

7. Program Description

Year/ Level	Course Code	Course Name	Credit Hours	
			Theoretical	Practical
1	ENV111	Mathematics	3	
	ENV112	Statics	3	
	ENV113	Engineering Drawing	0	6
	ENV114	Environmental Thermodynamics	2	
	ENV115	Statistics	2	
	UOM1011	Arabic1	2	
	UOM1040	Democracy and Human Rights	2	
	ENV121	Calculus	3	
	ENV122	Dynamics	2	
	ENV123	Principles of Environmental Engineering	2	
	ENV124	Environmental Geology	2	
	ENV125	Drawing by Computer		4
	UOM1031	Computer1	1	2
	UOM1021	English 1	2	
2	ENV211	Engineering Mathematics	3	
	ENV212	Fluids Mechanics	2	2
	ENV213	Environmental Chemistry	2	2
	ENV214	Engineering Surveying	2	3
	ENV215	Strength of Materials	2	
	ENV216	Engineering Hydrology	2	
	UOM2050	The Crimes of the Baath Party in Iraq	2	
	UOM2022	English 2	2	
	ENV221	Water Quality Engineering	3	2
	ENV222	Concrete and Building Technology	3	2
	ENV223	Survey Applications and GIS	2	3
	ENV224	Microbiology	2	2
	UOM2012	Arabic2	2	
	UOM2032	Computer2	2	2
3	ENV311	Principles of Air pollution	3	
	ENV312	Water Supply Networks	3	
	ENV313	Solid Waste Engineering	3	
	ENV314	Unit Operations & Processes	4	
	ENV315	Soil Mechanics	4	2
	ENV316	Engineering Analysis	2	
	ENV321	Soil and Ground Water Pollution	3	
	ENV322	Sewers Networks	3	
	ENV223	Noise Pollution	2	
	ENV324	Hydraulics Applications	2	
	ENV325	Hazardous Waste Management	3	
	ENV326	Numerical Analysis	2	
	ENV327	Reinforced Concrete	3	
4	ENV411	Design of Water Treatment Plants	2	
	ENV412	Wastewater Treatment Plant Design	4	
	ENV413	Structural Design	4	
	ENV414	Sustainability Engineering	2	
	ENV415	Engineering Project Management and Economy	4	
	ENV416	Engineering Project and Technical Writing	2	
	ENV421	Industrial and Petroleum Liquid Waste	3	
	ENV422	Estimation and Specifications	3	

	ENV423	Air Pollution Control	3	
	ENV424	Civil Drawing		5
	ENV425	Environmental Impact Assessment and Regulations	2	
	ENV426	Engineering Project	3	

8. 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)

9. Teaching and Learning Strategies

- Power point lectures
- Tutorial
- Laboratory experiments
- Computer laboratories
- Video lectures
- Team works

- Case Studies
- On-line lectures

10. Evaluation methods

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

11. 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			1	
Assist. Professor	Civil Engineering	Environmental Engineering			4	
Assist. Professor	Civil Engineering	Geotechnique			1	
Lecturer	Civil Engineering	Environmental Engineering			9	
Lecturer	Civil Engineering	Structural Engineering			5	
Lecturer	Civil Engineering	Geotechnique			1	

Assist. Lecturer	Civil Engineering	Environmental Engineering			5	
Assist. Lecturer	Civil Engineering	Structural Engineering			1	
Assist. Lecturer	Computer Engineering	Computer Engineering			1	

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.

12. 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.

13. The most important sources of information about the program

- Guidebook for Mosul University
- The departmental website:

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

14. 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											
Year/Level	Course Code	Course Name	Basic or Optional	Required program Learning outcomes							
				Knowledge			Skills			Ethics	
				A1	A2	A3	B1	B2	B3	C1	C2
1	ENV111	Mathematics	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	Basic	*							
	ENV122	Dynamics	Basic	*							
	ENV123	Principles of Environmental Engineering	Basic	*						*	
	ENV124	Environmental Geology	Basic	*							
	ENV125	Drawing by Computer	Basic						*		
	UOM1031	Computer1	Basic						*		
	UOM1021	English 1	Basic					*			
2	ENV211	Engineering Mathematics	Basic	*							
	ENV212	Fluids Mechanics	Basic	*			*				

	ENV213	Environmental Chemistry	Basic	*			*				
	ENV214	Engineering Surveying	Basic	*			*				
	ENV215	Strength of Materials	Basic	*							
	ENV216	Engineering Hydrology	Basic	*							
	UOM2050	The Crimes of the Baath Party 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						*		
3	ENV311	Principles of Air pollution	Basic	*							
	ENV312	Water Supply Networks	Basic	*	*						
	ENV313	Solid Waste Engineering	Basic	*	*						
	ENV314	Unit Operations & Processes	Basic	*							
	ENV315	Soil Mechanics	Basic	*			*				
	ENV316	Engineering Analysis	Basic	*							
	ENV321	Soil and Ground Water Pollution	Basic	*							
	ENV322	Sewers Networks	Basic	*	*						
	ENV223	Noise Pollution	Basic	*	*						

	ENV324	Hydraulics Applications	Basic	*								
	ENV325	Hazardous Waste Management	Basic	*								
	ENV326	Numerical Analysis	Basic	*								
	ENV327	Reinforced Concrete	Basic	*								
4	ENV411	Design of Water Treatment Plants	Basic	*	*							
	ENV412	Wastewater Treatment Plant Design	Basic	*	*							
	ENV413	Structural Design	Basic	*	*							
	ENV414	Sustainability Engineering	Basic	*								
	ENV415	Engineering Project Management and Economy	Basic	*								
	ENV416	Engineering Project and Technical Writing	Basic	*	*	*	*	*	*	*	*	*
	ENV421	Industrial and Petroleum Liquid Waste	Basic	*	*							
	ENV422	Estimation and Specifications	Basic	*							*	
	ENV423	Air Pollution Control	Basic	*	*							
	ENV424	Civil Drawing	Basic							*		
	ENV425	Environmental Impact Assessment and Regulations	Basic	*				*			*	
	ENV426	Engineering Project	Basic	*	*	*	*	*	*	*	*	*

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)					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)
UGI	One	1	ENV111	Mathematics	الرياضيات	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 Language	اللغة العربية	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	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
Two		1	ENV121	Calculus	حسابات التفاضل والتكامل	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	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					

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Mathematic		Module Delivery	
Module Type	Support or related learning activity		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ENV111			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	1	Semester of Delivery		1
Administering Department	ENV8	College	ENG4	
Module Leader	Mayada Hazim		e-mail	mayada.hmah@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.	
Module Tutor	Abeer Khalil Ibrahim		e-mail	abeer.alsaraf@uomosul.edu.iq
Peer Reviewer Name	Mayada Hazim		e-mail	mayada.hmah@uomosul.edu.iq
Scientific Committee Approval Date	21/9/2024	Version Number	2.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The aim of this course is to introduce the students to main topics of mathematic. The course will cover Prerequisites for mathematic, Limits, Continuity, and Differentiation (methods and applications), Matrices, Operations on matrices, and Solution of system of equations by matrix. At the end of the course, students will have a broad knowledge of the basic concepts, techniques and applications of Differentiation and Matrices. This will be achieved through theoretical lectures, tutorials and homework
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. CLO-1: Recognize fundamentals of math and the emphasis on functions and graphs(i). CLO-2: understanding various limit problems both algebraically and graphically and using it by checking the continuity of various types of functions(i). CLO-3: Finding the derivative of various types of functions using the differentiation rules (i). CLO-4: Applying differentiation to find linear approximation and optimization problems(ii) CLO-5: solve matrices and operations on matrices and using matrices in solving linear equations(i).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Prerequisites for calculus</u> Coordinates and Graphs in the Plane, Slope and Equations for Lines, Functions and Their Graphs, Shifts, Circles and Parabolas, A Review of Trigonometric Functions (17 hrs). <u>Part B – Limits and Continuity</u> Limits, The Sandwich Theorem and $(\sin \theta)/\theta$, Limits Involving Infinity, Continuous Functions. (10 hrs). <u>Part C – Derivatives</u> Slope, Tangent Lines, and Derivatives, Differentiation Rules, Velocity, Speed and Other Rate of Change, Derivatives of Trigonometric Functions, The Chain Rule, Implicit Differentiation and Fractional Powers, Linear Approximations and Differentials (17 hrs). <u>Part D - Applications of Derivatives</u> Related Rates of Change, Maximal, Minima and the Mean Value Theorem, Curve Sketching with y', y'', Graphing Rational Functions-Asymptotes and Dominant Terms, Optimization (18 hrs.).

	<u>Part E - Matrices</u> Operation on matrices, Equal matrices, Addition and Subtraction of matrices, Multiplication by scalar, Multiplication of matrices, Transpose of a matrices, adjoin of a square matrix, Determinants, Properties of determinants, Singular matrix, Solution of system of equations by matrix inversion, Cramer's rule to solve the system of equations, Gaussian elimination. (18hrs).		
Learning and Teaching Strategies استراتيجيات التعلم والتعليم			
Strategies الاستراتيجيات	Expanding students' perceptions of mathematic, 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.		
Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	80	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	70	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	5% (25)	3, 5, 8, 11 and 14	CLO-1, CLO-2, CLO-3, CLO-4, CLO-5
	Online Assignments	1	2% (2)	6	CLO-1, CLO-2.
	Onsite Assignment	5	2% (10)	3, 6, 9, 12 and 15	CLO-1, CLO-2, CLO-3, CLO-4, CLO-5.
	Projects / Lab.	0	0	0	
	Report	1	3% (3)	12	CLO-1, CLO-2, CLO-3, CLO-4.
Summative assessment	Midterm Exam	2hrs	10% (10)	9	CLO-1, CLO -2, CLO -3,
	Final Exam	3hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Coordinates and Graphs in the Plane, Slope and Equations for Lines.
Week 2	Functions and Their Graphs, shifts, circles and parabolas.
Week 3	A review of trigonometric functions.
Week 4	Limits, the sandwich theorem and $(\sin \theta)/\theta$, limits involving infinity.
Week 5	Continuous functions.
Week 6	Slope, tangent lines, and derivatives, differentiation rules, velocity, speed and other rate of change.
Week 7	Derivatives of trigonometric functions.
Week 8	The chain rule, implicit differentiation and fractional powers, linear approximations and differentials.
Week 9	Related rates of change.
Week 10	Maximal, minima and the mean value theorem, curve sketching with y' , y'' .
Week 11	Graphing Rational Functions-Asymptotes and Dominant Terms.
Week 12	Optimization.
Week 13	Operation on matrices, Equal matrices, Addition and Subtraction of matrices, Multiplication by scalar, Multiplication of matrices,
Week 14	Transpose of a matrices, adjoin of a square matrix, Determinants, Properties of determinants and Singular matrix.
Week 15	Solution of system of equations by matrix inversion, Cramer's rule, Gaussian elimination.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Finney, R.L, & Thomas, G.B, "Calculus" Addison. Wesley publishing company, USA, 11th, 2011.	Yes
Recommended Texts	Anton, H., Bivens, I.C., Davis, S., Calculus: Early Transcendentals, Wiley, 10th edition, 2011.	Yes
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Mechanics-Static		Module Delivery
Module Type	Support		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ENV112		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	1
Administering Department	ENV8	College	ENG4
Module Leader	Salim Yousif, Samir Yasso		e-mail syasso@uomosul.edu.iq
Module Leader's Acad. Title	lecturers		Module Leader's Qualification Ph.D.
Module Tutor	Ammar Mohammed		e-mail Ammar.mohammad@uomosul.edu.iq
Peer Reviewer Name	-----	e-mail	E-mail
Scientific Committee Approval Date	26/10/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	0
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The primary purpose of the study of engineering mechanics is to develop the capacity to predict the effects of force and motion while carrying out the creative design functions of engineering. This capacity requires more than a mere knowledge of the physical and mathematical principles of mechanics; also required is the ability to visualize physical configurations in terms of real materials, actual constraints, and the practical limitations which govern the behavior of machines and structures. One of the primary objectives in a mechanics course is to help the student develop this ability to visualize, which is so vital to problem formulation. Indeed, the construction of a meaningful mathematical model is often a more important experience than its solution.

	Maximum progress is made when the principles and their limitations are learned together within the context of engineering application.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Force systems and resultants</u> - To discuss the concept of the moment of a force and show how to calculate it in two and three dimensions. - To provide a method for finding the moment of a force about a specified axis. - To define the moment of a couple. - To present methods for determining the resultants of nonconcurrent force systems. - To indicate how to reduce a simple distributed loading to a resultant force having a specified location. <u>Part B – Equilibrium</u> - To develop the equations of equilibrium for a rigid body. - To introduce the concept of the free-body diagram for a rigid body. - To show how to solve rigid-body equilibrium problems using the equations of equilibrium. <u>Part C – Structural Analysis (Trusses)</u> - To show how to determine the forces in the members of a truss using the method of joints and the method of sections. - To analyze the forces acting on the members of frames and machines composed of pin-connected members. <u>Part D - Friction</u> To introduce the concept of dry friction and show how to analyze the equilibrium of rigid bodies subjected to this force. <u>Part E - Center of gravity and Centroid</u> - To discuss the concept of the center of gravity, center of mass, and the centroid. - To show how to determine the location of the center of gravity and centroid for a system of discrete particles and a body of arbitrary Shape. <u>Part F - Moment of inertia</u> - To develop a method for determining the moment of inertia for an area. - To introduce the product of inertia and show how to determine the maximum and minimum moments of inertia for an area. - To discuss the mass moment of inertia.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies الاستراتيجيات	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.			
Student Workload (SWL)					
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا					
Structured SWL (h/sem)		78	Structured SWL (h/w)		5.2
الحمل الدراسي المنتظم للطلاب خلال الفصل			الحمل الدراسي المنتظم للطلاب أسبوعيا		
Unstructured SWL (h/sem)		72	Unstructured SWL (h/w)		4.8
الحمل الدراسي غير المنتظم للطلاب خلال الفصل			الحمل الدراسي غير المنتظم للطلاب أسبوعيا		
Total SWL (h/sem)		150			
الحمل الدراسي الكلي للطلاب خلال الفصل					
Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	3% (15)	3, 5, ,10, 12 and 14	CLO-1, CLO-1, CLO-2, CLO-2, CLO-3
	Reports	2	4% (8)	11	CLO-5
	Assignments	7	1% (7)	3, 4, 6, 8, and 12	CLO-2, CLO-2, CLO-3, CLO-2, CLO-3
	Onsite Assignment	10	1% (10)	TBD	CLO-2, CLO-2, CLO-3, CLO-2, CLO-3
Summative assessment	Midterm Exam	2hrs	10% (10)	7	CLO-1, CLO -2 and CLO-3
	Final Exam	3hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		
Delivery Plan (Weekly Syllabus)					
المنهاج الاسبوعي النظري					
	Material Covered				
Week 1	Introduction, Fundamental concepts, Units of measurements, The international system of units, Numerical calculations, General procedure for analysis.				
Week 2	Scalars and Vectors, Vector Operations. The Free-Body Diagram				
Week 3	Coplanar Force Systems. Force System Resultants				
Week 4	Principle of Moments. Moment of a Couple				
Week 5	Reduction of a Simple Distributed Loading. Conditions for Rigid-Body Equilibrium, Free-Body Diagrams.				
Week 6	Two- and Three-Force Members.				
Week 7	Midterm Exam				
Week 8	Simple Trusses, The Method of Joints.				

Week 9	Simple Trusses, The Method of sections.
Week 10	Frame analysis
Week 11	Centroid of a Body.
Week 12	Centroid of Composite Bodies.
Week 13	Definition of Moments of Inertia for Areas, Moments of Inertia for Areas.
Week 14	Moments of Inertia for Composite Areas.
Week 15	Friction.
Week 16	Preparatory week before the final Exam.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Hibbeler, R.C. " ENGINEERING MECHANICS – DYNAMIC 14 TH EDITION 2016" Pearson Prentice Hall	Yes
Required Texts	MERIAM J.L., KRAIGE L.G. , BOLTON J.N. " Engineering Mechanics Volume 1 Statics " Ninth Edition 2018 John Wiley & Sons, Inc.	Yes
Recommended Texts	د.نزار جبرائيل - فخري ياسين – د.هشام العناز "الميكانيك الهندسي"	Yes
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Drawing	Module Delivery	
Module Type	Core	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	ENV113		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1		
Administering Department	ENV8	College	ENG4
Module Leader	Mohammed Hisham	e-mail	m.h.alkafaf@uomosul.edu.iq
Module Leader's Acad. Title	Lectures	Module Leader's Qualification	MSC
Module Tutor	Ayad Abdullah Mousa	e-mail	ayad_engineer@uomosul.edu.iq
Peer Reviewer Name	AMMAR MOHAMED	e-mail	E-mail
Scientific Committee Approval Date	20/09/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونواتج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The aim of this course is to help the students to use the technical drawing and performs drawing exercises with ruler, compass, T-square. make the student able to draw circles with straight lines, arcs and polygon. learns and applies dimensioning rules. knows the properties of cross section view and carry out the perspective drawings due to views.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO-1: use the technical drawing tools properly and to plot pictures according to the dimensions and properties of technical drawing. (i) CLO-2:Using scale, types of scales and measurement techniques to drawings.(i) CLO-3:Applying several geometric shapes by using a compass. (iii) CLO-4:Learning and applies dimensioning rules.(iii) CLO-5:Implementing the properties of cross section view. (iii) CLO-6:Carrying out the perspective drawings due to views. (iii) CLO-7:Increasing the students ability to imagine. (iii)
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Graphic instruments and their use</u> This lectures will describe the most common drafting instruments in use and discuss how they are use. (5 hrs) <u>Part B – Graphic geometry and engineering applications</u> In order to create the drafter or designer needs to know how to construct various common geometric patterns, for example parallel line, circle, arc, polygon and ellipse. (20 hrs) <u>Part C – Theory of projection. Orthographic projection</u> Explain the theory of projection.Consisting of a set of two or more separate views of an object taken from different direction. (15 hrs) <u>Part D - Isometric drawing</u> A three dimension drawing or sketch shows the entire object in one view from the two or three plains(front, top, side view) (15 hrs) <u>Part E - Missing view</u> Find the missing view from the other views. (10 hrs) <u>Part F - Section</u> (10 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	207	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20 % (20)	5, 8, ,11 and 13	All
	Classwork	10	12 % (10)	2, 3, 4, 6,7,9,10,12,14 and 15	All
	homework	14	8 % (8)	2, 3, 4,5, 6,7,8,9,10,11, 12,13,14 and 15	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered

Week 1	Introduction . Graphic instruments and their use. Types of lines
Week 2 - 5	Graphic geometry and engineering applications
Week 6-8	Theory of projection. Orthographic projection
Week 9-11	Isometric drawing
Week 12-13	Missing view
Week 14-15	Section

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	T.E.French ,engineering drawing and graphic technology (1986)	Yes
Recommended Texts	ثامر محمد نوري (كتاب الرسم الهندسي المساعد) 2021	Yes
	د.احمد العبيدي (الرسم الهندسي والهندسة الوصفية) 2021	Yes
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Thermodynamics and Heat Transfer		Module Delivery
Module Type	Supportive		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ENV114		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery	
Administering Department	ENV8	College	ENG4
Module Leader	Maan S. Mohammed	e-mail	maandabbagh@uomosul.edu.iq
Module Leader's Acad. Title	Ass. Professor	Module Leader's Qualification	M.Sc
Module Tutor	Maan S. Mohammed	e-mail	maandabbagh@uomosul.edu.iq
Peer Reviewer Name	Maan S. Mohammed	e-mail	maandabbagh@uomosul.edu.iq
Scientific Committee Approval Date	3/10/2024	Version Number	2.0
Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	N/A	Semester	
Co-requisites module	N/A	Semester	
Module Aims, Learning Outcomes and Indicative Contents			
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	Students will be able to: - Write clear the objectives of this integrated subject. - Enable the student to know theoretical and practical concepts of the thermodynamic processes. - Enable the student to know theoretical and practical concepts of the physics materials properties and heat effect on it. - Enable the student to measure the temperature and pressure with conventional and modern measuring devices. - Enable the student to know the types of energy and practice applications. - Develop the fundamental principles and laws of thermodin and to explore the implications of these principles for system behavior including: - formulate the models necessary to study. - Enable the student to know the types of system and their applications and how to deal with its - an ability to work with concepts mathematically, and a functional understanding of how these ideas play out in the real world. - Analyze and design heat transfer systems through the application of these principles. - Use graphs and diagrams to convey results. - develop the problem-solving skills essential to good engineering practice of heat		

	transfer in real-world applications. 13. Decide on strategies to be used and assumptions that need to be made.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks: CLO 1: Study of some concepts, definitions, and types of the systems. CLO 2: Measurement of pressure and temperature and know and explain the devices work principle of temperature and pressure CLO 3: Study the basic concepts of thermodynamics. CLO 4: Develop a flexible and creative problem-solving ability and translate physical descriptions into mathematical equations. CLO 5: Examine intermediate results or other quantities that could be used to ensure a solution. CLO 6: Identify what they don't understand and ask specific questions to gain understanding and develop their ability to communicate ideas of science. CLO 7: Enable the students who to use the programs of internet search to benefit sources, enable the student to prepare the daily special thermodynamics reports and prepare brochures which deal with the thermal effects on the environment. CLO 8: Enable the student to work in research centers and industrial institutions. CLO 9: Understand and apply the basic idea of heat transfer theorem to physical systems. CLO 10: Study of types of energy and their application. CLO 11: Study the difference between the closed and opened systems the mathematical models of the physical systems are explained and define and describe the steady state principle CLO 12: The mode of Heat Transfer. CLO 13: An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. CLO 14: An ability to acquire and apply new knowledge and using appropriate learning strategies. CLO 15: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Basic Quantities, including: [10 hrs] - State SI units and write the units and their abbreviations correctly. - The advantage of developing the student's ability to understand thermodynamics objects. - Know the types of energy and practice applications. - Know the difference between heat transfer and work. - How can be calculate the heat lost and gain from or by the system. - How can be calculate the energy from or by the system. - Distinguish heat transfer in the closed system. - Distinguish work in the closed system. Types of energy and it is applications: [10 hrs] - State, explain, and apply different between the gage pressure. - Differentiate between the pressure for the solid, liquid and gases. - How can calculate and transfer the units. - Solve problems using the The perfect gas law [10hrs] - What is the perfect gas (ideal gas) - Study the general gas law. - the behavior of many Gas constant, Boyle's law, Charles's law and Gay-Lussac's law.

	First law of thermodynamics and their application: [10 hrs] - In order to deal with the subject of applied thermodynamics rigorously it is necessary to know the difference between applications. - The state of working fluid. - Study the non-flow equation. - Study the steady flow equation. - The different between the closed system and open system and their application Heat Transfer: [5 hrs] - Heat Transfer by conduction. - Heat Transfer by convection. - Heat Transfer by radiation.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الاستراتيجيات	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.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	4% (20)	4,6,9,11, and 15	CLO 1,2,10,11, and 12
	Assignments	4	2% (8)	5,7,10,12	CLO 1,2,11, and 12
	On-site Assignments	2	2% (4)	3,8	CLO 10, and 12
	Reports	2	4% (8)	5, and 13	CLO 1,2,10,11, and 12
Summative assessment	Midterm Exam	2hrs	10% (10)	7	CLO1,2,3,4,5,6,7,8,9,10,11, and 12
	Final Exam	3hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction, dimensions and unit.

	Some concepts and definitions and types of the systems.		
Week 2	Measurement of pressure and temperature		
Week 3	Perfect gas laws		
Week 4	Solved problems sheet No.1	Homework 1	Quiz
Week 5	Forms of Energy		
Week 6	Solved problems sheet No.2	Homework 2	Quiz
Week 7	Mid-term Exam		
Week 8	Thermodynamics laws / First law of thermodynamics Thermodynamic processes - Applied to the closed system process		
Week 9	Solved problems sheet No.3	Homework 3	Quiz
Week 10	Thermodynamic processes - Applied to the open system process		
Week 11	Solved problems sheet No.4	Homework 4	Quiz
Week 12	The modes of heat transfer		
Week 13	Environmental application of Heat transfer		
Week 14	Isothermal and non-isothermal operations		
Week 15	Solved problems sheet No.5	Homework 5	Quiz
Week 16	Final Exam of the semester		

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Applied thermodynamics fifth edition by t.d eastop and a. mcconkey	Yes
Recommended Texts	Y. A. Çengel and M. A. Boles, Thermodynamics: An Engineering Approach, 5th ed, McGraw-Hill, 2006	No
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance.
	B - Very Good	جيد جدا	80 - 89	Above average with some errors.
	C - Good	جيد	70 - 79	Sound work with notable errors.
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings.
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria.
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Statistics		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar
Module Code	ENV115		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	Semester of Delivery	
Administering Department	ENV8	College	ENG4
Module Leader	Abdulmuhsin	e-mail	mss_qzz@uomosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	M.Sc.
Module Tutor	-----	e-mail	E-mail
Peer Reviewer Name	-----	e-mail	E-mail
Scientific Committee Approval Date	3/10/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	There is a need to know how to deal with a large amount of data. The objectives of this module are how to generate informative data and how to extract information from data and to explain the valuable methods to present these data and extract the conclusions from them. Additionally, the module includes how to describe the data in a clear manner.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO-1: Represent the collected data in a frequency table and histograms CLO-2: Identify the methods of statistical description CLO-3: Measure the deviation and dispersion of the data from the centre if it is symmetrical or skewed. CLO-4: Explaining the principles of probability and its use in statistical tests CLO-5: Using probability laws as tools to find the percentage of occasion occurrence. CLO-6: Employing probability distributions in decision-making CLO-7: Applying probability to test the hypotheses. CLO-8: Utilize normal distribution curve in the analysis of the problems. CLO-9: Using statistics as a tool for quality assurance of laboratory test. CLO-10: Test the relationships between variables.
Indicative Contents المحتويات الإرشادية	Part A – Introduction to Statistics (3 hrs.) Part B – Frequency distribution and data presentation (6 hrs.) Part C – Measures of central tendency and variation (6 hrs.) Part D – Probability distribution, rules and laws (6 hrs.) Part E – Probability and combinatorial analysis (6 hrs.) Part F – Normal distribution (6 hrs.) Part G – Application of Normal distribution and hypotheses testing (9 hrs) Part H – Correlation between variables

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course will include lectures, individual & group assignments. Exercises will include different methods to treat the data statistically according to type of data. The course will be taught in Arabic, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	6	24% (24)	2, 3, 4, 5, 7, 8, 9	CLO-1, CLO-2, CLO-3, CLO-4, CLO4, CLO5 and CLO-7
	Assignments	2	6% (6)	2, 7	CLO-1, CLO-2, CLO-4 and CLO5
	Report	1	4% (4)	8	CLO-7, CLO-10
	On site	1	6%(6)	2-13	CLO-7, CLO-10
Summative assessment	Midterm Exam	1	10% (10)	10	(1)CLO-1, CLO-2, CLO-3; (2) CLO-4, CLO-5 and CLO-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Nature of Statistics: Introduction, statistical notations Frequency Distributions: Frequency Distribution Table, Cumulative Frequency
Week 2	Graphical presentation: Frequency Distribution, Cumulative Frequency Distribution. Measures of central Tendency for raw and tabulated data: The Mean: Arithmetic, Geometric
Week 3	Harmonic mean, Median, Mode. Measures of Dispersion or Variation: Range, Mean Deviation,
Week 4	Variance and Standard deviation for raw and tabulated data, Standardized score, Relationship between central tendency measures and unimodal distribution
Week 5	Probability and distributions: Sample space,
Week 6	probability rules, events and cases
Week 7	Probability laws: Addition law, Multiplication law.
Week 8	Combinations and permutations.
Week 9	Probability and Combinatorial analysis
Week 10	Normal distribution
Week 11	Application of Normal distribution
Week 12	Hypotheses testing: Z-test
Week 13	t distribution: t-test for a mean
Week 14	Chi-square distribution: Chi-square test for variance and standard deviation
Week 15	Correlation : Correlation coefficient
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Introduction to Statistics by Al-Rawi Kh.	Yes
Recommended Texts	Statistics for Sanitary Engineers by Berthouex and Brown, 2nd ed. (2002)	No
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title اسم المنهج	اللغة العربية 1		Module Delivery
Module Type نوع المنهج	اساسي		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar
Module Code رمز المنهج	UOM1011		
ECTS Credits عدد الوحدات	2		
SWL (hr/sem) الحمل الكلي	50		
Module Level / المستوى	1	Semester of Delivery / سحب المنهج	
Administering Department القسم الإداري	ENV8	College الكلية	ENG4
Module Leader اسم التدريسي			e-mail البريد الالكتروني
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor			e-mail
Peer Reviewer Name	-----	e-mail	E-mail
Scientific Committee Approval Date	26/9/2024	Version Number	2.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	لا يوجد	Semester	
Co-requisites module	لا يوجد	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	الهدف من هذا الفصل الدراسي هو تعريف الطلاب بالموضوعات الرئيسية لمادة اللغة العربية. سيغطي الفصل الدراسي المتطلبات الأساسية لتعاريف اللغة العربية، قواعد نحوية للأزمنة، تنمية القدرات النحوية لصيغ المفرد والجمع والممنوع من الجرد، بالإضافة الى البلاغة والتطبيق. وفي نهاية الفصل، سيكون لدى الطلاب معرفة واسعة بالمفاهيم وسيتم تحقيق ذلك من خلال المحاضرات النظرية والدروس والواجبات البتية والتقارير ذات الصلة بالمواضيع المطروقة.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO1: تعريف الطالب بألفاظ اللغة العربية الصحيحة وتراكيبها وأساليبها السليمة بطريقة مشوقة وجذابة. CLO2: أن يستغل الطالب وقت فراغه بالقراءة والاطلاع والرجوع إلى المكتبة. CLO3: تمكين الطالب من القراءة الصحيحة، وأن يكتسب القدرة على استعمال اللغة استعمالاً صحيحاً في الاتصال مع الآخرين. CLO4: تنمية الذوق الأدبي لدى الطالب حتى يدرك النواحي الجمالية في أساليب الكلام ومعانيه وصورة. CLO5: تنمية قدرة ومهارة الطالب الإملائية والخطية بحيث يستطيع الكتابة الصحيحة للكتب والمخاطبات الرسمية. CLO6: تمكين الطالب على كتابة التقارير العملية والنظرية والعروض التقديمية بلغة عربية واضحة وصحيحة. CLO7: القدرة على اكتساب وتطبيق المعرفة الجديدة واستخدام استراتيجيات تعليم مناسبة. CLO8: القدرة على المشاركة والعمل بمهنية وإخلاقية للعمل في فرق متعددة التخصصات.
Indicative Contents المحتويات الإرشادية	الجزء الأول: مقدمة عن اللغة العربية (4 ساعات) • مقدمة عن اللغة العربية • تعريف اللغة العربية ومميزاتها الجزء الثاني: قواعد نحوية وتشمل: (6 ساعات) • الفعل الماضي • الفعل الماضي • الأفعال الخمسة الجزء الثالث: تنمية القواعد النحوية وتشمل: (6 ساعات) • المثنى والجمع (المذكر السالم والمؤنث السالم) • التعجب • الممنوع من الصرف • المجرد والمزيد الجزء الرابع: البلاغة والتطبيق (8 ساعات) • الاستعارة • الجناس • الطباق • التشبيه الجزء الخامس: قواعد املائية: (3 ساعات) سوف يتم تعريف الطالب عن الأخطاء الإملائية الشائعة وطرق تجنبها بالإضافة الى كتابة المخاطبات الادرية. الجزء السادس: قواعد العد والمعدود: (3 ساعات)

		تعريف الطالب بقواعد واحكام العد والمعدود في اللغة العربية.			
Learning and Teaching Strategies					
استراتيجيات التعلم والتعليم					
Strategies الاستراتيجيات		توسيع مدارك الطلاب لمادة اللغة العربية، والإلمام بالمفاهيم الأساسية للغة العربية والبلاغة، والقدرة على التمييز بين الأزمنة. يحتوي هذه الفصل على العديد من المكونات التي تشمل دراسة المحاضرات والبرامج التعليمية والمناقشة والواجبات المنزلية ومنصات التعلم الإلكتروني. سيتم تدريس الدورة باللغة العربية، ويجب تقديم جميع المهام الإلزامية في غضون المواعيد النهائية للقبول في الامتحان.			
Student Workload (SWL)					
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا					
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل		33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا		2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل		17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا		1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل		50			
Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment التقويم التكويني	Quizzes الكويز	3	6% (18)	4, 9, and 13	All
	H.W Assignments الواجبات البيتية	2	4% (8)	5, 11	CLO4, CLO5, and CLO6
	Seminars السمنار	1	6% (6)	12	All
	On-site Assignment واجبات داخل الصف	2	4% (8)	6, 10	CLO4, CLO5, and CLO6
Summative Assessment التقويم التلخيصي	Midterm Exam امتحان نصف الفصل	2 hrs	10% (10)	7	All
	Final Exam الامتحان النهائي	3 hrs	50% (50)	16	All
Total Assessment / التقويم النهائي			100% (100 Marks)		
Delivery Plan (Weekly Syllabus)					
المنهاج الاسبوعي النظري					
	Material Covered / المواضيع المغطاة				
Week 1	مقدمة عن اللغة العربية وتعريف اللغة العربية ومميزاتها				
Week 2	قواعد نحوية: الفعل الماضي				

Week 3	قواعد نحوية: الفعل المضارع
Week 4	قواعد نحوية: الأفعال الخمسة
Week 5	تنمية القواعد النحوية: المثنى والجمع (المذكر السالم والمؤنث السالم)
Week 6	تنمية القواعد النحوية: التعجب، الممنوع من الصرف والمجرد والمزيد
Week 7	الامتحان الفصلي
Week 8	البلاغة والتطبيق: الاستعارة
Week 9	البلاغة والتطبيق: الجناس
Week 10	البلاغة والتطبيق: الطباق
Week 11	البلاغة والتطبيق: التشبيه
Week 12	الأخطاء الإملائية
Week 13	المخاطبات الإدارية
Week 14	قواعد واحكام العد والمعدود
Week 15	قواعد واحكام العد والمعدود
Week 16	الامتحان النهائي

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered / المواضيع المغطاة
Week 1	لا يوجد
Week 2	لا يوجد
Week 3	لا يوجد
Week 4	لا يوجد
Week 5	لا يوجد
Week 6	لا يوجد
Week 7	لا يوجد

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text الاسم	Available in the Library? هل متوفر في المكتبة؟
Required Texts المنهج المطلوب	جامع الدروس العربية / مصطفى الغلاييني	نعم
Recommended Texts المنهج الموصى به	النحو الوافي / عباس حسن	نعم
Websites المواقع الالكترونية	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors

	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title اسم المنهج	الديمقراطية وحقوق الانسان Democracy and Human Rights		Module Delivery
Module Type نوع المنهج	اساسي		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar
Module Code رمز المنهج	UOM1040		
ECTS Credits عدد الوحدات	2		
SWL (hr/sem) الحمل الكلي	50		
Module Level / المستوى	1	Semester of Delivery / سحب المنهج	1
Administering Department القسم الإداري	ENV8	College الكلية	ENG4
Module Leader اسم التدريسي	نهال عبد الوهاب حامد		e-mail البريد الالكتروني nehal.hamid@uomosul.edu.iq
Module Leader's Acad. Title	مدرس مساعد Assistant Lecture	Module Leader's Qualification	ماجستير MS. C.
Module Tutor	نهال عبد الوهاب حامد	e-mail	nehal.hamid@uomosul.edu.iq
Peer Reviewer Name	نهال عبد الوهاب حامد	e-mail	nehal.hamid@uomosul.edu.iq
Scientific Committee Approval Date	26/10/2024	Version Number	1.0
Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	لا يوجد	Semester	
Co-requisites module	لا يوجد	Semester	

Module Aims, Learning Outcomes and Indicative Contents			
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Objectives أهداف المادة الدراسية	1. تعريف الطالب بمفهوم حقوق الانسان 2. تعريف الطالب بالتطور التاريخي لحقوق الانسان 3. تعريف الطالب بمصادر حقوق الانسان 4. تعريف الطالب بالمصادر الدينية لحقوق الانسان 5. تعريف الطالب بالحقوق والحريات التي نص عليها الدستور العراقي		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO1: المعرفة والفهم CLO2: معرفة جذور حقوق الانسان CLO3: معرفة المصادر الدولية (العالمية والاقليمية) CLO4: التعرف على الاعلانات والاتفاقيات المنظمة لحقوق الانسان CLO5: تنمية مهارات البحث والتعلم لدى الطلبة فيما يتعلق بموضوع المادة CLO6: تعزيز قدرة الطالب التحليلية بتدريبه على كيفية توظيف ما يتوفر لديه من معلومات في دراسته		
Indicative Contents المحتويات الإرشادية	الديمقراطية وحقوق الانسان المطلب الاول: حقوق الانسان والحريات العامة: إطار مفاهيمي. (8 ساعات) أولاً: الحق والحرية لغة واصطلاحاً ثانياً: خصائص حقوق الانسان ثالثاً: انواع حقوق الانسان المطلب الثاني: التطور التاريخي لحقوق الانسان (8 ساعات) أولاً: حقوق الانسان في حضارة بلاد ما بين النهرين ثانياً: حقوق الانسان في الحضارة الاغريقية ثالثاً: حقوق الانسان في العصر الحديث المطلب الثالث: حقوق الانسان في الشرائع السماوية (8 ساعات) أولاً: الديانة اليهودية ثانياً: الديانة المسيحية ثالثاً: الدين الاسلامي المطلب الرابع: الحقوق والحريات في الدستور العراقي لعام 2005 (9 ساعات) أولاً: الحقوق المدنية ثانياً: الحقوق والحريات الفكرية ثالثاً: الحقوق السياسية رابعاً: الحقوق الاقتصادية والاجتماعية والثقافية.		
Learning and Teaching Strategies			
استراتيجيات التعلم والتعليم			
Strategies الاستراتيجيات	توسيع مدارك الطالب لمادة الديمقراطية وحقوق الانسان، والالمام بالحقوق الاساسية التي يجب ان يتمتع بها الفرد، والقدرة على التمييز بين الحقوق والواجبات، من خلال المحاضرات فضلاً عن الاختبارات اليومية والفصلية		
Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعاً			
Structured SWL (h/sem)	33	Structured SWL (h/w)	2.2

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment التقويم التكويني	Quizzes الكويز	2	7% (14)	5, and 12	CLO4, CLO6
	Assignments الواجبات	1	6% (6)	9	CLO5
	Seminars السمنار	1	10% (10)	13	CLO6
	Report التقارير	1	10% (10)	6	CLO2, CLO3, and CLO4
	Onsite Assignment واجبات داخل الصف	0	0	0	
Summative Assessment التقويم التلخيصي	Midterm Exam امتحان نصف الفصل	2 hrs	10% (10)	7	All
	Final Exam الامتحان النهائي	3 hrs	50% (50)	16	All
Total Assessment / التقويم النهائي			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered / المواضيع المغطاة
Week 1	تعريف الحق والحرية لغة واصطلاحا
Week 2	خصائص حقوق الانسان
Week 3	انواع حقوق الانسان
Week 4	حقوق الانسان في حضارة بلاد ما بين النهرين
Week 5	حقوق الانسان في الحضارة الاغريقية
Week 6	حقوق الانسان في العصر الحديث
Week 7	الامتحان الفصلي
Week 8	حقوق الانسان في الشرائع السماوية: الديانة اليهودية
Week 9	حقوق الانسان في الشرائع السماوية: الديانة المسيحية

Week 10	حقوق الانسان في الشرائع السماوية: الدين الاسلامي
Week 11	الحقوق المدنية
Week 12	الحقوق والحريات الفكرية
Week 13	الحقوق السياسية
Week 14	الحقوق الاقتصادية والاجتماعية والثقافية
Week 15	الحقوق الاقتصادية والاجتماعية والثقافية
Week 16	الامتحان النهائي

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered / المواضيع المغطاة
Week 1	لا يوجد
Week 2	لا يوجد
Week 3	لا يوجد
Week 4	لا يوجد
Week 5	لا يوجد
Week 6	لا يوجد
Week 7	لا يوجد

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text الاسم	Available in the Library? هل متوفر في المكتبة؟
Required Texts المنهج المطلوب	حقوق الإنسان، جعفر صادق مهدي	
Recommended Texts المنهج الموصى به	حقوق الإنسان (تطورها ومضامينها وحمايتها)، رياض عزيز هادي	
Websites المواقع الالكترونية	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Calculus		Module Delivery	
Module Type	Support or related learning activity		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ENV121			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	1	Semester of Delivery		2
Administering Department	ENV8	College	ENG4	
Module Leader	Mayada Hazim		e-mail	mayada.hmah@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	M.Sc.
Module Tutor	Abeer Khalil Ibrahim Aya Thamer Ibrahim		e-mail	abeer.alsaraf@uomosul.edu.iq aya.thamer@uomosul.edu.iq
Peer Reviewer Name	Mayada Hazim		e-mail	mayada.hmah@uomosul.edu.iq
Scientific Committee Approval Date	19/9/2024	Version Number	2.0	

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	None		Semester	
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The aim of this course is to introduce the students to the main topics of Calculus. The course will cover Integration, Applications of Definite Integrals, The Calculus of Transcendental Function, Techniques of Integration and Polar Coordinates. At the end of the course, students will have a broad knowledge of the basic concepts of integration, techniques of integration, applications of definite integrals, and Polar coordinates. This will be achieved through theoretical lectures, tutorials and homework.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. CLO-1: Recognize indefinite integrals and definite integral and know the basic properties(i). CLO-2: Use applications of definite integral to find areas between curves, volumes, lengths of plane curves and areas of surfaces of revolution(ii). CLO-3: Identified and understand of transcendental functions and know the basic properties(i). CLO-4: Applied techniques of integration to change unfamiliar integrals into integrals we can recognize and solve(i). CLO-5: Identified and understand of Polar Coordinates and know the basic properties(i).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Integration</u> Calculus and Area, Formulas for Finite sums, Definite Integrals, The Fundamental Theorems of Integral Calculus, Indefinite Integrals, Integration by Substitution –Running the Chain Rule Backward(10 hrs). <u>Part B –Applications of Definite Integrals</u> Areas between Curves, Calculus and Area, Volumes of Solids of Revolution-Disks and Washers, Cylindrical Shells-An Alternative to Washers, Lengths of Curves in the Plane, Areas of Surfaces of Revolution(15 hrs). <u>Part C –The Calculus of Transcendental Function</u> Inverse Function and Their Derivatives, $\ln x$, e^x, and Logarithmic Differentiation, Indeterminate Forms and Hospital's Rule, Other Exponential and Logarithmic Function, The Inverse Trigonometric Function, Derivatives of Inverse Trigonometric Functions(15 hrs). <u>Part D - Techniques of Integration</u> Basic Integration Formulas, Integration by Parts, Trigonometric Integrals, Trigonometric Substitutions, Rational Functions and Partial Fractions, Using Integral Tables. Improper Integrals. (20 hrs).

	<u>Part E - Plane Curves and Polar Coordinates</u> Polar Coordinates: Definition of Polar Coordinates, Negative Values of r, Changing to Radian Measure, The Use of Radian Measure, Elementary Coordinate Equations and Inequalities, Cartesian Versus Polar Coordinates, Graphing in Polar Coordinates: Symmetry and Slope, Faster Graphing, Finding the Points Where Curves Intersect. (15 hrs).		
Learning and Teaching Strategies استراتيجيات التعلم والتعليم			
Strategies الاستراتيجيات	Expanding students' perceptions of Calculus, familiarity with basic Calculus 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.		
Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	80	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	70	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	5% (25)	3, 5, ,8,11 and 14	CLO-1, CLO-2, CLO-3, CLO-4, CLO-5
	Online Assignments	1	3% (3)	6	CLO-1, CLO-2.
	Onsite Assignment	4	2% (8)	3, 6, 9, 12 and 15	CLO-1, CLO-2, CLO-3, CLO-4, CLO-5.
	Projects / Lab.	0	0	0	
	Report	1	4% (4)	12	CLO-1, CLO-2, CLO-3, CLO-4.
Summative assessment	Midterm Exam	2hrs	10% (10)	9	CLO-1, CLO -2, CLO -3,
	Final Exam	3hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Calculus and Area, Formulas for Finite sums, Definite Integrals, The Fundamental Theorems of Integral Calculus, Indefinite Integrals,
Week 2	Integration by Substitution –Running the Chain Rule Backward.
Week 3	Areas between Curves, Calculus and Area.
Week 4	Volumes of Solids of Revolution-Disks and Washers, Cylindrical Shells-An Alternative to Washers.
Week 5	Lengths of Curves in the Plane, Areas of Surfaces of Revolution
Week 6	Inverse Function and Their Derivatives, $\ln x$, e^x , and Logarithmic Differentiation
Week 7	Indeterminate Forms and Hospital's Rule, Other Exponential and Logarithmic Function.
Week 8	The Inverse Trigonometric Function, Derivatives of Inverse Trigonometric Functions.
Week 9	Basic Integration Formulas, Integration by Parts.
Week 10	Trigonometric Integrals, Trigonometric Substitutions.
Week 11	Rational Functions and Partial Fractions.
Week 12	Using Integral Tables. Improper Integrals.
Week 13	Polar Coordinates: Definition of Polar Coordinates, Negative Values of r , Changing to Radian Measure, The Use of Radian Measure.
Week 14	Elementary Coordinate Equations and Inequalities, Cartesian Versus Polar Coordinates,
Week 15	Graphing in Polar Coordinates: Symmetry and Slope, Faster Graphing, Finding the Points Where Curves Intersect.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources				
مصادر التعلم والتدريس				
	Text			Available in the Library?
Required Texts	Finney, R.L. & Thomas, G.B, "Calculus" Addison. Wesley publishing company, USA,11th,2011.			Yes
Recommended Texts	Anton, H., Bivens, I.C., Davis, S., Calculus: Early Transcendentals, Wiley, 10th edition, 2011.			Yes
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/			
Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Mechanics-Dynamics		Module Delivery
Module Type	Support		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ENV122		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	2
Administering Department	ENV8	College	ENG4
Module Leader	Salim Yousef	e-mail	sua@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Phd
Module Tutor	Salim Yousef	e-mail	
Peer Reviewer Name	Salim Yousef	e-mail	E-mail
Scientific Committee Approval Date	17/09/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	0
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	- To learn basic concepts and system of forces. - To enable students to understand the relationship of physical processes, kinetics and kinematics. - To develop skills to use the basic principles of mechanics in engineering applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 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.
Indicative Contents المحتويات الإرشادية	<u>Part A: Basic Considerations</u> - To introduce the concepts of position, displacement, velocity, and acceleration. - Vector Operations - Algebra and Computations - Vector Calculus—Velocity and Acceleration - Newtonian Mechanics - Newton's Laws - Systems of Units - Energy and Momentum <u>Part B: Particle Kinematics</u> - Rectilinear Kinematics: Continuous Motion - Curvilinear Motion: - Rectangular Components - Normal and Tangential Components - Rectangular Cartesian Coordinates - Curvilinear Coordinates - Cylindrical and Polar Coordinates - Spherical Coordinates - Arbitrary Curvilinear Coordinates - Motion of a Projectile - Absolute Dependent Motion Analysis of Two Particles

	Part C: Relative Motion • Coordinate Transformations ◦ Rotation Transformations ◦ Rotation Sequences • Displacement • Time Derivatives ◦ Angular Velocity and Acceleration ◦ Analytical Description • Velocity and Acceleration Analysis Using a Moving Reference Frame • Observations from a Moving Reference Frame. Part D – Particle Kinetics • Newton's Second Law of Motion • Equation of Motion: Rectangular Coordinates • Investigate central-force motion and apply it to problems in space mechanics. • The principle of work and energy • Power and Efficiency • Principle of Linear Impulse and Momentum for a System of Particles • The concept of a conservative force • Theorem of conservation of energy to solve kinetic problems. • Friction Forces and Spring Forces.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	50	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	3.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	75	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5.0
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	3% (15)	3,5,10,12, and 14	CLO#2, CLO#3, CLO#4, CLO#6, CLO#7, CLO#8, and CLO#9
	On-site Assignments	5	2% (10)	2,4,9,11, and 13	CLO#1, CLO#2, CLO#3, CLO#4, CLO#5, CLO#6, CLO#7, CLO#8, and CLO#9
	Report	1	5% (5)	6	CLO#10, CLO#11, and CLO#12
	Online Assignment	5	2% (10)	2,4,9,11, and 13	CLO#1, CLO#2, CLO#3, CLO#4, CLO#5, CLO#6, CLO#7, CLO#8, and CLO#9
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO#1, CLO#2, CLO#3, CLO#4, CLO#5, and CLO#6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to concepts of position, displacement, velocity, and acceleration.
Week 2	Vector Operations: Algebra and Computations and Vector Calculus—Velocity and Acceleration.
Week 3	Newtonian Mechanics: Newton's Laws, Systems of Units, and Energy and Momentum
Week 4	Rectilinear Kinematics: Continuous Motion. Curvilinear Motion: Rectangular Components, and Normal and Tangential Components
Week 5	Rectangular Cartesian Coordinates Curvilinear Coordinates: Cylindrical and Polar Coordinates, Spherical Coordinates, and Arbitrary Curvilinear Coordinates.
Week 6	Motion of a Projectile and Absolute Dependent Motion Analysis of Two Particles.
Week 7	Coordinate Transformations: Rotation Transformations, and Rotation Sequences
Week 8	Displacement, Time Derivatives: Angular Velocity and Acceleration, and Analytical Description.
Week 9	Velocity and Acceleration Analysis Using a Moving Reference Frame.

Week 10	Observations from a Moving Reference Frame.
Week 11	Newton's Second Law of Motion and Equation of Motion: Rectangular Coordinates
Week 12	Investigate central-force motion and apply it to problems in space mechanics.
Week 13	The principle of work and energy, and Power and Efficiency
Week 14	Principle of Linear Impulse and Momentum for a System of Particles, and the concept of a conservative force.
Week 15	Theorem of conservation of energy to solve kinetic problems, and Friction Forces and Spring Forces.
Week 16	Final Exam of the semester

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	N/A
Week 2	N/A
Week 3	N/A
Week 4	N/A
Week 5	N/A
Week 6	N/A
Week 7	N/A

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Hibbeler, R.C. " ENGINEERING MECHANICS – DYNAMIC 14TH EDITION 2016" Pearson Prentice Hall	Yes
Required Texts	MERIAM J.L., KRAIGE L.G., BOLTON J.N. " Engineering Mechanics Volume 2 Dynamics " Ninth Edition 2018 John Wiley & Sons, Inc.	Yes
Recommended Texts	د.نزار جبرائيل - فخري ياسين – د.هشام العناز "الميكانيك الهندسي"	Yes
Recommended Texts	MERIAM J.L., KRAIGE L.G., BOLTON J.N. " Engineering Mechanics Volume 2 Dynamics " Ninth Edition 2018 John Wiley & Sons, Inc.	No
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Principles of environmental engineering		Module Delivery
Module Type	core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar
Module Code	ENV123		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery	2
Administering Department	Environmental Engineering (EE)	College	College of Engineering
Module Leader	Hanan Haqi Ismael	e-mail	hanan.eng2014@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	MSC
Module Tutor	Thura Azzam Abed	e-mail	thura.azzam@uomosul.edu.iq
Peer Reviewer Name	Dr. Amar Thamer	e-mail	Dr.ammarthamir@uomosul.edu.iq
Scientific Committee Approval Date	15/9/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aim of the course is to introduce the student to the main principles of environmental engineering and everything related to environmental pollution: an introduction to the environment, environmental pollution, and the factors that lead to environmental deterioration. Types of pollution (water pollution, air pollution, noise pollution, thermal pollution, water pollution, water sources and their characteristics, Chemical and physical properties of water, water quality, surface water pollution and its sources, groundwater pollution and its sources, treatment of water for drinking purposes with a table of units and a brief explanation of each unit, Treatment and disposal of waste water,

	characteristics of waste water, treatment objective, plan of waste water treatment units Treatment and disposal of waste water, characteristics of waste water, treatment goal, plan of waste water treatment units, with site visits being conducted to identify the treatment units and environmental projects established and under implementation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding the environment, its surrounding factors, types of pollution, and how to preserve it architecturally. 2. Summarizing the common types of pollution (water pollution, air pollution, etc.) 3. Explaining each type of environmental pollution with ways to treat it or reduce its effects on the environment. 4. Introducing the student to many environmental terms. 5. Analyzing some environmental problems using engineering methods. 6. Finding engineering solutions that are compatible with available capabilities.
Indicative Contents المحتويات الإرشادية	1. Introduction to the environment and environmental pollution CLO1 2 hours. 2. Surface and groundwater pollution with treatment units. CLO2. Water sources and their characteristics, chemical and physical properties of water. Surface water pollution and its sources, groundwater pollution and its sources. Treatment of water for drinking purposes with a table of units and a brief explanation of each unit. Solving problems using the mass balance method. 10 hours. 3. Environmental pollution with solid waste. CLO3 Introduction, sources and characteristics of solid waste, solid waste, solid waste collection, solid waste disposal methods. Finding the area of the sanitary landfill site with drawing typical sections. 10 hours. 4. air pollution. CLO4 Introduction to air pollution, its sources and effects, characteristics of pollutants, air pollutant removal units. 5 hours 5. Noise, thermal and radiation pollution. CLO5 10 hours Introduction to noise pollution, its sources, how to calculate noise, introduction to thermal pollution, sources of thermal pollution, the effect of thermal emissions on the environment. Radioactive pollution, its sources and types.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course will include many in-person and electronic lectures. The student will also be assigned assignments and reports. Field visits will be conducted for students to some environmental projects. The language of instruction will be in Arabic, and Arabic and English methodical books will be approved.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20%	4, 8,10,12	CLO-1, CLO-1, CLO-2, CLO-2
	Homework	3	12%	5, 7,9,11	CLO-2, CLO-2, CLO-3, CLO-2, CLO-3
	Report	1	4%	13-1	CLO-2 to CLO-5
	Class assignments	1	4%	12-4	CLO-2 to CLO-5
Summative assessment	Midterm Exam	1.5 hr	10%	6	All
	Final Exam	3hr	50%	16	CLO-1, CLO -2 and CLO-3
Total assessment			100% (100 Marks)		All

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري والالكتروني	
	Week Material Covered
Week 1	The environment, the factors that led to its deterioration, the role of the environmental engineer to reduce pollution, types of environmental pollution.
Week 2	Water pollution: sources of water and their characteristics, chemical and physical properties of water, surface water pollution and its sources, groundwater pollution and its sources.
Week 3	Mass balance, lakes, the phenomenon of thermal stratification, nutrients, seasonal reversals, solving mathematical problems. Concentrations of pollutants in lakes are not found.
Week 4	Drinking water treatment plant, factors that must be studied to select units.
Week 5	Drawing of a typical treatment unit for treating surface and ground drinking water, with a simplified explanation of each unit.
Week 6	Wastewater treatment units, their sources and characteristics, a simplified explanation of a typical treatment unit.
Week 7	Exam 1
Week 8	Environmental pollution with solid waste, introduction, sources and characteristics of solid waste, solid waste, solid waste collection.
Week 9	Solid waste disposal methods. Calculating the area of the sanitary tract site with a typical section

	drawing.
Week 10	Air pollution, introduction to air pollution, its sources and effects, characteristics of pollutants.
Week 11	Units for removing air pollutants and particles, solving mathematical problems.
Week 12	Noise pollution, introduction to noise pollution, its sources, how to calculate noise.
Week 13	Exam 2
Week 14	Thermal pollution, Introduction to thermal pollution, sources of thermal pollution, and the effect of thermal emissions on the environment.
Week 15	Radioactive pollution. Its sources. Types of radiation that are harmful to the environment. Methods of prevention.
Week 16	Preparing for the final exam.

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Environmental Technology Dr. Tariq Muhammad Saeed	
Recommended Texts	Metcalf and Eddy "Wastewater engineering, treatment and resource recovery", McGraw hill, New York, 2014.	
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Environmental Geology		Module Delivery	
Module Type	Supported		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	ENV124			
ECTS Credits	3			
SWL (hr/sem)	75			
Module Level	1	Semester of Delivery		2
Administering Department	ENV8	College	ENG4	
Module Leader	Dr. Mohammed		e-mail	mohammed1979eng@uomosul.edu.iq
Module Leader's Acad. Title	Assist. Professor		Module Leader's Qualification	Ph.D.
Module Tutor	-----		e-mail	E-mail
Peer Reviewer Name	-----		e-mail	E-mail
Scientific Committee Approval Date	12/09/2024		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None		Semester
Co-requisites module	None		Semester

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, it is better to be equal to the number of study weeks. CLO-1: The students will learn and take some information on the principles of geology, especially the earth's materials and compounds. (i) CLO-2: The students will be able to distinguish the different types of rocks and soils(ii) CLO-3: apply the principles of the contour line to draw topographic maps (iii) CLO-4: The student who completes the course can communicate orally with others about some topics related to the relationship between environment and earth science and write some simple reports in this regard (v) CLO-5: Report the data obtained from the selective topics of environmental geology given and organized during the course (iv) CLO-6: Creating some opinions about the emerging environmental issues and trying to give some solutions compatible with the problems related to environmental geology (vii)
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A Introduction</u> Introduction, objectives, the general definition of environmental geology Historical geology (4 hrs) <u>Part B – Structural Geology</u> Composition, formation of the earth's crust, types of rocks (8 hrs) <u>Part C – Geology of water</u> Geology of water supply, (part1) Surface Water, (part2) Ground Water Geology of dams and reservoirs (8 hrs) <u>Part D – materials and maps geology</u> Geology of building materials Topographical and geological maps Environmental geology: special subjects (10 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	25 % (25)	3, 6, 9	CLO-1, CLO-1, CLO-2, CLO-4
	Assignments		5% (5)		
	Projects / Lab.				
	Report	1	10 % (10)		All
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO -2 and CLO-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction, objectives, general definition of environmental geology
Week 2	Historical geology
Week 3	Composition, formation of the earth's crust
Week 4	Composition, formation of the earth's crust
Week 5	Structural geology, rocks

Week 6	Structural geology, rocks
Week 7	Geology of water supply, (part1) Surface Water
Week 8	Geology of water supply,, (part2) Ground Water
Week 9	Environmental geology: special subjects
Week 10	Geology of dams and reservoirs
Week 11	Geology of dams and reservoirs
Week 12	Geology of building materials
Week 13	Topographical and geological maps
Week 14	Topographical and geological maps
Week 15	Environmental geology: special subjects
Week 16	Preparatory week before the Final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Ghazi Atia Zarraq, Dr.Lafta Salman Kadhim, Dr.Mahmood Fadhil Abid, " Environmental Geology ", Iraq, 2016	No.
Recommended Texts	Courses from theinternet	Yes
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme

مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work is required but credit awarded
	F – Fail	راسب	(0-44)	A considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Drawing by Computer		Module Delivery
Module Type	Support		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	ENV125		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	
Administering Department	ENV8	College	ENG4
Module Leader	Mohammed Hisham	e-mail	m.h.alkafaf@uomosul.edu.iq
Module Leader's Acad. Title	Lectures	Module Leader's Qualification	MSC
Module Tutor	Ayad Abdullah	e-mail	ayad_engineer@uomosul.edu.iq
	Abeer Khalil		abeer.khalil@uomosul.edu.iq
Peer Reviewer Name	Ammar Mohamed	e-mail	E-mail
Scientific Committee Approval Date	12/09/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Drawing	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This course contains comprehensive training in AutoCAD. It incorporates the features, commands, and techniques for creating, editing, and printing 2D drawings with AutoCAD LT.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO-1: Become familiar with the AutoCAD user interface. (i) CLO-2: Understand the fundamental concepts and features of AutoCAD. (i) CLO-3: Use the precision drafting tools in AutoCAD to develop accurate technical drawings. (i) CLO-4: Present drawings in a detailed and visually impressive manner. (ii)
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A</u> Getting started with AutoCAD (4 hrs) <u>Part B</u> Basic drawing and editing commands (drawing lines, erasing objects, drawing vertical lines, drawing rectangles, drawing circles, undo and redo actions) (8 hrs) <u>Part C</u> Create a simple drawing (4 hrs) <u>Part D</u> Making changes in your drawing (selecting objects for editing, moving objects, copying rotating objects, scaling objects, mirroring objects) (12 hrs) <u>Part E</u> Annotation commands; Hatch , hatch edit , Image draw order (24 hrs) <u>Part F</u> Organizing drawing with layers , creating new drawings with templates , layer states (8 hrs)
Strategies	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.

Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5.8
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20 % (20)	6, 10	All
	Classwork	7	12 % (12)	2, 3, 4, 9,11,12,13	All
	homework	2	8 % (8)	5,8	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	All
	Exp. exam	1 hr	10 % (10)	15	All
	Final Exam	3hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Getting started with AutoCAD
Week 2 - 5	drawing lines, erasing objects, drawing vertical and horizontal lines, drawing rectangles, drawing circles, undo and redo actions
Week 6	Create a simple drawing
Week 8-13	Annotation commands; Hatch, hatch edit, Image draw order
Week 14-15	Organizing drawing with layers , creating new drawings with templates, layer states

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Autodesk AutoCAD 2018 online Help	Yes
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer1		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOM 1031		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	Semester of Delivery	
Administering Department	ENV8	College	ENG4
Module Leader	Abeer Khalil Ibraheem	e-mail	Abeer.alsaraf@uomosul.edu.iq
Module Leader's Acad. Title	Assist Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Abeer Khalil Ibrahim	e-mail	abeer.alsaraf@uomosul.edu.iq
Peer Reviewer Name	Abeer Khalil Ibraheem	e-mail	Abeer.alsaraf@uomosul.edu.iq
Scientific Committee Approval Date	19/9/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The Module aim is to prepare student to deal with computers. In addition to, teach the student the fundamentals of computers and its components. Furthermore, learning how to use two of Microsoft Office applications (Word and Excel).
Module Learning Outcomes	1. An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2. An ability to acquire and apply new knowledge and using appropriate learning strategies.

مخرجات التعلم للمادة الدراسية	3. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. It is expected from the student who passes this module learn the following topics: 1. Introduction to computer 2. Data and information 3. Computer components 4. Memory type 5. Operating System and Graphical user interface 6. Exploring Microsoft Office 2013 7. Getting Started with Word Essentials 8. Monthly LAB Exam 9. Editing and Formatting Documents 10. Getting Started with Excel Essentials 11. Organizing and Enhancing Worksheets 12. Creating Formulas and Charting Data
Indicative Contents المحتويات الإرشادية	Introduction to computer [4 hr] Data and information [4 hr] Computer components [6 hr] Memory type [6 hr] Operating System and Graphical user interface [6 hr] Exploring Microsoft Office 2013 [6 hr] Getting Started with Word Essentials [6 hr] Monthly LAB Exam [3 hr] Editing and Formatting Documents [4 hr] Getting Started with Excel Essentials [6 hr] Organizing and Enhancing Worksheets [3 hr] Creating Formulas and Charting Data [3 hr]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the Lab activities, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, laboratory and by considering type of external search involving some of computer technology that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	50	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	25	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	6% (12)	4, 11	LO #Q1: 1-2, Q2: 7-9
	Assignments	2	3% (6)	3, 10	LO #A1: 1-2, A2: 7-9
	Lab.	3	6% (18)	5,8,12	All
	Report	1	4% (4)	11	All
Summative assessment	Midterm Exam	2 hr	10% (10)	9	All
	Final Exam	3hr	50% (50)		
Total assessment			(100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to computer , concept of hardware and software, Software and Hardware Interaction
Week 2	Data and information , connecting input / output devices , and peripherals to CPU
Week 3	Computer components, computer portion, hardware part, I/O units,
Week 4	Memory type, CPU components , personal computer
Week 5	Operating System and Graphical user interface, basic of common operating system
Week 6	Windows File Management , concept of folders and directories
Week 7	Exploring Microsoft Office 2013 , Getting Started with Word Essentials , basic of Word processing , opening and closing of documents, text creation, Editing and Formatting Documents
Week 8	Word processing (continued)

Week 9	Monthly Exam
Week 10	Spread sheet basic of spread sheet, editing and printing of spread sheet
Week 11	Presentation software, basic of Presentation software creating software
Week 12	Getting Started with Excel Essentials
Week 13	Getting Started with Excel Essentials (continued)
Week 14	Introduction to internet and Web browsers , computer network basic ,
Week 15	Concept of internets and its application
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المناهج الاسبوعي للمختبر

	Material Covered
Week 1, 2	Introduction to computer , concept of hardware and software, Software and Hardware Interaction
Week 3, 4	Computer components, computer portion, hardware part, I/O units,
Week 5	Operating System and Graphical user interface, basic of common operating system
Week 6,7	Windows File Management , concept of folders and directories , Editing and Formatting Documents
Week 8, 9,10	Exploring Microsoft Office 2013 , Getting Started with Word Essentials , basic of Word processing , opening and closing of documents, text creation, Editing and Formatting Documents
Week 11,12,13	Getting Started with Excel Essentials
Week 14	Organizing and Enhancing Worksheets
Week 15	Creating Formulas and Charting Data

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	2015 Computer Literacy BASICS: A Comprehensive Guide to IC3 Connie Morrison, Dolores Wells, Lisa Ruffolo Cengage Learning. ISBN: 128576658X	Available as PDF
Recommended Texts	IC3 GS5 Certification Guide Using Windows 10 & Office 2016	Available as PDF
Websites	Google Classroom	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	English 1		Module Delivery
Module Type	Support		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☒ Seminar
Module Code	UOM1021		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	1	Semester of Delivery	
Administering Department	Environmental Engineering (EE)	College	College of Eng.
Module Leader	Dr. Mustafa Siham	e-mail	Mustafa.qassab@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/10/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course develops further knowledge of the grammar and of essential vocabulary in order to lead the students to an advanced level of proficiency. Emphasis is placed on developing listening, speaking, reading and writing skills through an integrated approach. It focuses on grammar and fundamental writing skills. By the end of the course, students are expected to: 1. Understand the main ideas of a variety of written and spoken texts 2. Participate effectively in a short conversation using appropriate language 3. Produce a range of text types in the form of a logical and cohesive paragraph 4. Select appropriate vocabulary to talk about feelings, opinions and experiences. 5. Recognize, understand and use a number of phrasal verbs and collocations. 6. Use effective organizational strategies that include introductions, paragraphs, transitions, and conclusion
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO 1: An ability to acquire and apply new knowledge and using appropriate learning strategies. CLO 2: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. CLO 3: Comprehend and analyze various written and spoken texts: Demonstrate the ability to understand the main ideas, key details, and nuances of different types of texts, including articles, essays, speeches, and dialogues. CLO 4: Communicate effectively in spoken interactions: Engage in short conversations using appropriate language and effective communication strategies. Express ideas, opinions, and experiences clearly and coherently. Demonstrate active listening skills and respond appropriately to others. CLO 5: Produce well-structured written texts: Generate logically organized and cohesive paragraphs in written assignments. Apply appropriate grammar, vocabulary, and sentence structures to enhance clarity and coherence. Use effective writing strategies such as introductions, topic sentences, transitions, and conclusions. CLO 6: Employ appropriate vocabulary and expressions: Select and use a wide range of vocabulary to accurately express feelings, opinions, and personal experiences. Recognize, understand, and utilize phrasal verbs and collocations to enhance language fluency and natural expression. CLO 7: Apply effective language organization and coherence:

	Demonstrate the ability to structure and organize written and spoken communication effectively. Use appropriate discourse markers and transitional words to establish coherence and facilitate smooth flow of ideas. These course learning outcomes aim to develop the students' overall English language proficiency and skills in listening, speaking, reading, and writing. By the end of the course, students should be able to understand and analyze various texts, participate actively in conversations, produce well-structured written texts, employ appropriate vocabulary and expressions, and demonstrate effective language organization and coherence.
Indicative Contents المحتويات الإرشادية	Grammar Vocabulary Everyday English
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome	
Quizzes	3	12% (12)	4, 7, 10	LO #1, 3, 5, 6	

Formative assessment	Assignments	3	9% (9)	2,4,6	LO #1, 5, 6
	Reports	1	9% (9)	9	LO #4, 5, 7
	Online Assessment	1	10% (10)	10, 11, 12, 13	LO #1, 2, 4, 5, 7
Summative assessment	Midterm Exam	2 hr	10% (10)	15	LO # 1-6
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	UNIT 1 A world of difference: part 1
Week 2	UNIT 1 A world of difference: part 2
Week 3	UNIT 1 A world of difference: part 3
Week 4	UNIT 2 The working week: part 1.
Week 5	UNIT 2 The working week: part 2.
Week 6	UNIT 2 The working week: part 3.
Week 7	UNIT 3 Good times, bad times: part 1.
Week 8	UNIT 3 Good times, bad times: part 2.
Week 9	UNIT 3 Good times, bad times: part 3.
Week 10	Online assessment Group1.
Week 11	Online assessment Group2.
Week 12	Online assessment Group3.
Week 13	Online assessment Group4.
Week 14	Reviewing the Units 1-3 and open discussion.
Week 15	Midterm exam.
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)		
المنهاج الاسبوعي للمختبر		
	Material Covered	
Week 1		
Week 2		
Week 3		
Week 4		
Week 5		
Week 6		
Week 7		
Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	SOARS, J. & SOARS, L. 2014. New Headway: Intermediate Fourth Edition: Student's Book and iTutor Pack, OUP Oxford.	No
Recommended Texts		
Websites		

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

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	Engineering Mathematics	الرياضيات الهندسية	English	3				2		3	78	72	150	6.00	S	ENV121
		2	ENV212	Fluids Mechanics	ميكانيك الموائع	English	2		2		2		3	93	57	150	6.00	C	
		3	ENV213	Environmental Chemistry	كيمياء البيئة	English	2		2				3	63	37	100	4.00	S	
		4	ENV214	Engineering Surveying	المساحة الهندسية	English	3		3				3	93	32	125	5.00	S	
		5	ENV215	Strength of Materials	مقاومة المواد	English	2				1		3	48	52	100	4.00	S	ENV112
		6	ENV216	Engineering Hydrology	علم المياه	English	2						3	33	42	75	3.00	S	
		7	UOM201	Crimes of Baath Party	جرائم حزب البعث	Arabic	2						3	33	17	50	2.00	B	
					Total		16	0	7	0	5	0	21	441	309	750	30.00		
														28					
	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
	Four	1	ENV221	Water Quality Engineering	هندسة نوعية المياه	English	3		2				3	78	72	150	6.00	C	
		4	ENV222	Concrete and Building Technology	تكنولوجيا الخرسانة والبناء	English	4		2				3	93	57	150	6.00	S	
		3	ENV223	Noise Pollution	تلوث الضوضاء	English	2						3	33	67	100	4.00	C	
		4	ENV224	Survay Applications and GIS	تطبيقات المساحة ونظم المعلومات الجغرافية	English	2		3				3	78.00	72	150.00	6.00	S	
		5	ENV225	Engineering Analysis	تحليلات هندسية	English	2						3	33.00	67	100.00	4.00	S	
		6	ENV226	Microbiology	احياء مجهرية	English	2		2				3	63	37	100	4.00	S	
					Total		15	0	9	0	0	0	18	378	372	750	30.00		
														24					

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Engineering mathematics		Module Delivery	
Module Type	Support or related learning activity		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☒ Seminar	
Module Code	ENV211			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	2	Semester of Delivery		3
Administering Department	ENV8	College	ENG4	
Module Leader	Nadia Afram Yaqoob		e-mail	n.alrhmany@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.	
Module Tutor	Abeer Khalil Ibrahim		e-mail	abeer.alsaraf@uomosul.edu.iq
Peer Reviewer Name	Nadia Afram Yaqoob		e-mail	n.alrhmany@uomosul.edu.iq
Scientific Committee Approval Date	17/09/2024	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Calculus	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This course provides students with the fundamentals for plane analytic geometry (Circle, parabola, Ellipse, Hyperbola), partial derivatives for Functions of two or more variables, Hyperbolic function, Catenary, Multiple Integration and Differential equations (1st order 1st degree).
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. CLO-1: Identify the fundamentals for plane analytic geometry (Circle, parabola, Ellipse, Hyperbola) (i) CLO-2: Identify and understand the partial derivatives for function of two or more variable. (i) CLO-3: Find the error in the dimension, area and volume and estimate the least amount of material for constructions tanks by using total differentiation for functions of two or more variable. (ii) CLO-4: Use the partial derivatives to find the maximum and minimum of functions of several independent variables (Lagrange multipliers method). (ii) CLO-5: Identify the hyperbolic function, their graphs, their derivatives, their integrals, and their inverse functions. (i) CLO-6: Applied the hyperbolic function in catenary of cable. (ii) CLO-7: Find the area, volume, mass, center of gravity, moment and moment of inertia of the functions by using multiple integration (ii) CLO-8: Use double integral in polar coordinate to find the area and volume of the functions. (ii) CLO-9: Understand the formation and solution of ordinary differential equation 1st order 1st degree. (i)
Indicative Contents المحتويات الإرشادية	Indicative content includes the following <u>Part A –Plan analytic Geometry/conic section</u> Circle, Parabola, Ellipse, Hyperbola. (5 hrs.) <u>Part B – partial derivative</u> Functions of two or more variables, Domain and range for functions of two or more variables, Limits and Continuity for functions of two or more variables, Partial derivatives for functions of two or more variables, Chain rule, Total differentiation for Functions of two or more variables, Max. and min. of function of several independent variables, Max. and min. of function of several independent variables (method of Lagrange multipliers). (20 hrs.) <u>Part C – Hyperbolic function</u> Hyperbolic function identities, Derivatives and Integration of hyperbolic function, Graphs of hyperbolic functions, Invers of hyperbolic function, Graphs of hyperbolic functions in invers, Differentials and integrations of hyperbolic functions in invers, catenary of cable (10 hrs.)

	<u>Part D - Multiple Integration</u> Double Integration, Revised Integration, Physical Applications of the Double Integration, Double Integration in Polar Form, Triple Integration. (20 hrs.) <u>Part E - Differential Equations (D.E.)</u> Formation of D.E., The Solution of 1st order 1st degree D.E. (Variable Separable Method, Homogenous Method, Linear Method, Exact Method). (20 hrs.)
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	6 % (30)	5,7,10,11 and 15	CLO-1, CLO-2, CLO-3, CLO-4, CLO-5, CLO-6, CLO-7, CLO-8, CLO-9
	Online Assignments	1	2 % (2)	6	CLO-1, CLO-2, CLO-3
	Onsite Assignments	3	2 % (6)	9,11 and 15	CLO-2, CLO-7, CLO-8, CLO-9
	Projects/Lab	0	0		
	Report	1	2% (2)	12	CLO-2, CLO-3, CLO-4, CLO-7, CLO-8
Summative assessment	Midterm Exam	2hr	10% (10)	9	CLO-1 to CLO-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			(100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Plan analytic Geometry / conic section (Circle, Parabola, Ellipse, Hyperbola).
Week 2	Functions of two or more variables, Domain and range of two or more variables
Week 3	Limits and Continuity for functions of two or more variables, Chain rule,
Week 4	Total differentiation for Functions of two or more variables, Max. and min. of function of several independent variables,
Week 5	Max. and min. of function of several independent variables (method of Lagrange multipliers)
Week 6	Hyperbolic function identities, Derivatives and Integration of hyperbolic function, Graphs of hyperbolic functions, Invers of hyperbolic function, Graphs of hyperbolic functions in invers.
Week 7	Differentials and integrations of hyperbolic functions in invers, catenary of cable.
Week 8	Double Integration, Revised Integration.

Week 9	Physical Applications of the Double Integration.
Week 10	Double Integration in Polar Form.
Week 11	Triple Integration.
Week 12	Differential Equations (D.E.), Formation of D.E.
Week 13	The Solution of 1st order 1st degree D.E. by Variable Separable Method, Homogenous Method.
Week 14	The Solution of 1st order 1st degree D.E. by Linear Method.
Week 15	The Solution of 1st order 1st degree D.E. by Exact Method.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Finney, R.L,& Thomas ,G.B, "Calculus" Addison. Wesley publishing company, USA,11th,2011.	Yes
Recommended Texts	Anton, H., Bivens, I.C., Davis, S., Calculus: Early Transcendentals, Wiley, 10th edition, 2011.	Yes
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C – Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Fluid Mechanics		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ENV212		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	ENV8	College	ENG4
Module Leader	Mohammed Salim Mahmood	e-mail	Mohammedsalim@uomosul.edu.iq
Module Leader's Acad. Title	Assist. Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	-----	e-mail	E-mail
Peer Reviewer Name	-----	e-mail	E-mail
Scientific Committee Approval Date	12/9/2024	Version Number	2

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering mechanics	Semester	2
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Fluid mechanics deals with the fluid while it is in its static and motion conditions, as the curriculum deals with the basic principles and laws derived on the basis of these principles that govern the fluid in each case. The focus is on the fluid, which is in its liquid state, especially water, as the environmental engineer deals with water in various engineering aspects in the applied field. The application of the laws is clarified through various mathematical examples with their illustrations, after the mathematical formulas for these laws are derived. The curriculum also includes deepening the understanding and assimilation of the theoretical side through practical application by conducting laboratory experiments on a number of the main topics of the subject.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. CLO-1: Defining the formulas that give the main parameters of fluids (i). CLO-2 : Defining the basic laws that control the behave of fluids in static and dynamics state (i). CLO-3: Formulate the main equations that cover the fundamentals of concern fields (i). CLO-4 : Applying 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). CLO-5: Applying a certain design procedures for special cases of problems. CLO-6 : Correlating the theoretical principles with practical by carrying out laboratory experiments with analysis of results and discussion (iii).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Theoretical part: • Fluids properties, Fluid statics: Pressure in fluid; Types of pressure; Pressure measuring devices.(15 hrs) • Pressure force on submerged plane surface; Pressure force on submerged curved surface. (10 hrs) • Fluid Kinematics: Flow patterns; Continuity equation and its applications. (10 hrs) • Bernoulli's equation and its applications. (10 hrs) • Momentum equation and its applications. (10 hrs) • Flow of real fluid in pipe, friction loss, types of problems, minor losses. (10 hrs) • Pipes in series and parallel. (10 hrs) 2. Laboratory part: • Determine the force exerted on submerged plane surface. (2 hrs) • Prove the Bernoulli equation. (2 hrs) • Determine the Reynold number. (2 hrs) • Study flow through orifice in tank. (2 hrs) • Calculate the discharge in pipe using Venturi meter and orifice meter. (2 hrs) • Calculate the discharge through open channel using rectangular and triangle weir. (2 hrs) • Determine the force exerted by water jet on plane and curved surface. (2 hrs) • Determine the friction factor in pipe. (2 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course has several components that include lectures, individual & group assignments, field visits 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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	5% (25)	4,6,10,12 and 14	CLO-1, CLO-1, CLO-2, CLO-2 ,CLO-3 ,CLO-3 ,CLO-5
	Online assignments	2	1% (2)	6, and 12	CLO-1,CLO-2, CLO-2, CLO-3
	On site assignments	5	1% (5)	2,6,8,10,14	CLO-1, CLO-2, CLO-2 ,CLO-3 ,CLO-3
	Report / Lab.	8	1% (8)	3, ,5,6,7, 9, 11, 12,13	CLO-4, CLO-6
Summative assessment	Midterm Exam	2hr	10% (10)	8	CLO-1, CLO -2 and CLO-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1-2	Fluids properties, Fluid statics: Pressure in fluid; Types of pressure; Pressure measuring devices
Week 3-4	Pressure force on submerged plane surface; Pressure force on submerged curved surface
Week 4-5	Fluid Kinematics: Flow patterns; Continuity equation and its applications
Week 6-8	Bernoulli's equation and its applications
Week 9-10	Momentum equation and its applications
Week 11-12	Flow of real fluid in pipe, friction loss, types of problems, minor losses
Week 13-15	Pipes in series and parallel
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	Determine the force exerted on submerged plane surface
Week 3-4	Determine the friction factor in pipe
Week 5-6	Prove the Bernoulli equation
Week 7-8	Determine the Reynold number
Week 9-10	Calculate the discharge in pipe using orifice meter
Week 11-12	Calculate the discharge in pipe using Venturi meter and orifice meter
Week 13-15	Determine the force exerted by water jet on plane and curved surface

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Esposito, A., 1998, Fluid Mechanics with applications, Prentice Hall, Inc.	yes
Recommended Texts	Cengel Y. and Cimbala J., 2014, Fluid Mechanics Fundamentals and Applications, 4th edition, McGraw Hill.	Yes
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Environmental Chemistry		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☒ Practical ☐ Seminar
Module Code	ENV213		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	2	Semester of Delivery	
Administering Department	ENV8	College	ENG4
Module Leader	Waad Mohammed Ali (Theoretical) Abeer Hashim Hassan (practical)		e-mail waadd1976@uomosul.edu.iq abeerhashim2014@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.S.C
Module Tutor	-----	e-mail	E-mail
Peer Reviewer Name	-----	e-mail	E-mail
Scientific Committee Approval Date	16/09/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The aim of this course is to introduce the students to the area of environmental chemistry. The course will cover the chemistry of the air, water and soil and examine the environmental fate of anthropogenic chemicals released into the environment. We will see how chemical principles can be used to explain and predict reactions, partitioning, and concentrations of anthropogenic chemicals in different environmental compartments. We will examine some of the effects of pollutants on humans, other animals, plants and the nonliving parts of the earth. And, we will consider possible green chemistry, engineering and societal approaches to mitigating deleterious effects of pollution. The course will be beneficial to chemists, chemical and environmental engineers, and environmental scientists.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. CLO-1: Identify and evaluate the relative importance of various reactions, physical processes and CLO-2: Demonstrate an understanding of atmospheric chemistry and air pollution CLO-3: Solve problems involving the principles of chemical kinetics. CLO-4: Describe the greenhouse effect, climate change; and distinguish between fossil fuels and renewable energy technologies. CLO-5: Describe chemical reactions and processes responsible for creating the “ozone hole”. CLO-6: Describe the scientific basis underlying global climate change and the American Chemical Society position and recommendations regarding climate change. CLO-7: Calculate equilibrium concentrations of organic pollutants in environmental compartments based on partition coefficients. Assess the advantages and limitations of such calculations. CLO-8: Explain basic concepts of water chemistry and water pollution
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Atmospheric Chemistry and Air Pollution</u> · Stratospheric Chemistry: The Ozone Layer · The Ozone Holes · The Chemistry of Ground-Level Air Pollution · The Environmental and Health Consequences of Polluted Air— Outdoors and Indoors <u>Part B – The Greenhouse Effect, Climate Change, Fossil Fuels and CO₂</u> · The Greenhouse Effect · Energy Use, Fossil Fuels, CO₂ Emissions, and Global Climate Change · Biofuels and Other Alternative Fuels · Renewable Energy Technologies: Hydroelectric, Wind, Solar, Geothermal, and Marine Energy and Their Storage · <u>Part C – Toxic Organic Compounds</u> Toxic Heavy metals · Pesticides · Dioxins, Furans, and PCBs Other Toxic Organic Compounds of Environmental Concern · Wastes, Soils and Sediment <u>Part D – Water chemistry and Water Pollution</u> The Chemistry of Natural Waters · The Pollution and Purification of Water

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	This course has several components that include lectures, individual & group

	assignments, field visits 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. The basic laboratory work supports lecture topics.
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	4% (16)	2, 3, ,12 and 14	CLO-1, CLO-2, CLO-3, CLO-5
	Assignments	5	2% (10)	2, 3, 4, 6, and 10	CLO-2, CLO-2, CLO-3, CLO-2, CLO-3
	Projects / Lab.	7	1% (7)	1,2,3,4,5,6,7,8,9, 10,11,12,13,14, and 15	All
	Report Theoretical	2	1% (2)	13	CLO-1, CLO3, CLO8
	Report Practical	5	1% (5)	3,6,9,12,15	CLO-1, CLO3, CLO8
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO -2 and CLO-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Environmental Chemistry
Week 2	Basic Chemical Concepts
Week 3	Chemical Reactions and Stoichiometry
Week 4	Acid Base Reactions
Week 5	Oxidation-Reduction Reactions
Week 6	Reactions Involving gases
Week 7	Common Ion Effect
Week 8	Equilibrium Among Gases and Liquid
Week 9	Reactions Kinetics
Week 10	Gas Transfer Across Air – water Interfaces
Week 11	Organic Chemistry
Week 12	Water Chemistry
Week 13	Buffers
Week 14	Soil Chemistry
Week 15	Atmospheric Chemistry

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Safety in laboratories.
Week 2	Introduction to chemical analyses.
Week 3	Water and solutions.
Week 4	Types of solutions.
Week 5	Distinguish between an acid and a base.
Week 6 & week 7	Methods for calculating the volume and concentrations of solutions.
Week 8 & week 9	Titration and the types of titrations.
Week 10	Types of indicators.
Week 11	Titration of acids and base.
Week 12	Alkalinity in water
Week 13	Acidity in water.

Week 14 & week 15	Methods of analysis
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Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Gary W. vanLoon and Stephen J. Duffy "Environmental Chemistry: A Global Perspective" 3rd Edition, Oxford University Press, 2010	Yes
Recommended Texts	- Colin Baird and Michael Cann "Environmental Chemistry" 5th Edition, 2012. - Lab Manual: Environmental Laboratory Exercise for Instrumental Analysis and Environmental Chemistry by Dunnivant, ISBN # 9780471488569, Publisher: Wiley - APHA, AWWA and WPCF (1998). Standard Methods for the Examination of Water and Wastewater. 18th ed., APHA, Washington, D.C.	Yes
Websites		

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Engineering Surveying		Module Delivery	
Module Type	Supported		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	ENV214			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	2	Semester of Delivery		3
Administering Department	ENV8	College	ENG4	
Module Leader	Dr. Mohammed		e-mail	mohammed1979eng@uomosul.edu.iq
Module Leader's Acad. Title	Assist. Professor		Module Leader's Qualification	Ph.D.
Module Tutor	-----		e-mail	E-mail
Peer Reviewer Name	-----		e-mail	E-mail
Scientific Committee Approval Date	12/09/2024	Version Number	1.0	

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	None		Semester	
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This course aims to introduce the students to the category of Engineering surveying . Introductory and definitions, which are used in plane surveying: Instruments for measuring distance obstacles in measurements Instruments for setting out right angles, Tape corrections. Leveling, Areas, and volumes. Computation of volumes. The Theodolite and Traverse surveying. Tachometry. Curves. Total instrument station, GPS field procedure. This will be achieved through descriptive lectures.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, it is better to be equal to the number of study weeks. CLO-1: The students will be able to define and distinguish the fundamentals of measuring. (i) CLO-2: after taking analysis and synthesis design processes, the student can make a primary design of some issues of roads (ii) CLO-3: The student will be able to conduct some tests and measurements of surveying, like elevations and coordinates using different devices. (iii) CLO-4: The students will be able to make suitable judgments in engineering situations of surveying problems like road construction. (v) CLO-5: Report the data obtained from the selective topics of surveying topics given and organized during the course (iv) CLO-6: Creating some opinions about the emerging environmental issues and trying to give some solutions compatible with the problems related to surveying aspects (vii)
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A Introduction</u> Basic Definitions, Types of Surveying, Units, and conversions Linear measurements, tape measurements, and corrections (9 hrs) <u>Part B – Leveling</u> Leveling definitions and instruments, Leveling methods, Longitudinal and cross-sections, Contouring (21hrs) <u>Part C – Theodolites</u> Theodolites, Angles, bearings, coordinates (9 hrs) <u>Part D – Surveying topics</u> Total Station Surveying, GPS principles, Vertical Curves (6 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	18 % (18)	3, 6, 9 and 11	CLO-1, CLO-2, CLO-4
	Assignments Online	7	7% (7)	2,4,8,10,12	CLO-1, CLO-2, CLO-4
	Quiz /Lab.	1	5% (5)	16	CLO-3
	Report	10	10 % (10)	All	CLO-3
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO-2, CLO-4
	Final Exam	3hr	50% (50)	16	CLO-1, CLO-2, CLO-4
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basic Definitions, Types of Surveying, Units, and conversions
Week 2	Linear measurements

Week 3	tape measurements
Week 4	corrections
Week 5	Leveling definitions and instruments
Week 6	Leveling methods
Week 7	Longitudinal and cross-sections
Week 8	Contouring
Week 9	Contouring
Week 10	Theodolites
Week 11	Angles, bearings
Week 12	coordinates
Week 13	Total Station Surveying
Week 14	GPS principles
Week 15	Vertical Curves
Week 16	The preparatory week before the Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Area measurement by tape and guiding
Week 2	Construct right angles in different ways
Week 3	Projecting a building using a tape measure
Week 4	Projecting a building using the polygon method
Week 5	Leveling device installation
Week 6	Leveling the ground using a leveling device
Week 7	Leveling the ground using a leveling device
Week 8	Longitudinal section and cross-section
Week 9	Longitudinal section and cross-section
Week 10	Theodolite device installation
Week 11	Projecting a building using a Theodolite device
Week 12	Projecting a building using a Theodolite device
Week 13	Total station device installation
Week 14	Use the quick functions in the Total Station device
Week 15	Use the quick functions in the Total Station device

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	B. Kavannagh. "Surveying with Construction Applications", 6th edition	yes
Recommended Texts	Courses from internet	Yes
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work is required but credit awarded
	F – Fail	راسب	(0-44)	A considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Strength of materials		Module Delivery	
Module Type	Support		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ENV215			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	2	Semester of Delivery		3
Administering Department	ENV8	College	ENG4	
Module Leader	Rana Burhan		e-mail	rn.burha@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	MSc.	
Module Tutor	-----		e-mail	E-mail
Peer Reviewer Name	-----		e-mail	E-mail
Scientific Committee Approval Date	2/10/2024	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Mechanics	Semester	2
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This course is a study of the effect of external loads on structural elements and the behavior of the elements under these loads. Determination of different types of stresses, strains and the relation between them, calculation of stresses in thin-walled pressure vessels, drawing shear and bending-moment diagrams of beams, calculation of bending and shear stresses in beams, and calculating deflections in beams using double integration method are explained in details. The course aims to expand the student's understanding of the structural elements behavior under different loads- that is essential to design and evaluate any structural member.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. CLO-1: Explain the different types of stresses, the relation between them and Understanding how to calculate them (i). CLO-2: Recognize the relation between stress and strain and explain how to calculate them (i). CLO-3: Apply fundamental mechanics to evaluate the suitable structural element dimensions that can be applied without exceeding the stress and strain limits of member (ii). CLO-4: Demonstrate an understanding of the assumptions and limitations of the theories used in mechanics of materials to draw the shear and moment diagrams for beams subjected to various loads (i) CLO-5: Find the maximum shear value and maximum moment value for beams subjected to various loads (i) CLO-6: Apply the theories of mechanics of materials to determine the bending and shear stresses for beams subjected to various loads (i) CLO-7: Formulate deflection equations for beams subjected to various loads (i). CLO-8: Demonstrate an understanding of theories of deflection to find deflection values for beams subjected to various loads (ii)
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Simple Stresses</u> Normal Stress, Shear Stress, Bearing Stress, Thin Walled Cylinders (Pressure Vessels) (9hrs) <u>Part B – Simple Strain</u> Strain (Simple Strain ,Stress-Strain Diagram, Hooke's Law, Poisson's Ratio, Statically Indeterminate Problems , Thermal Strain) (9 hrs) <u>Part C – Shear and Moment in Beams</u> Introduction, Supports and Load, Shear-Moment Equations, Area Method for Drawing Shear and Moment Diagram (9 hrs) <u>Part D - Stresses in Beams</u> Stresses in Beams(Shear and Flexural Stresses in Beams) (9 hrs) <u>Part F - Beam Deflections</u> Double Integration Method (9 hrs)

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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course has several components that include lectures, individual & group assignments, field visits 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.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	5 % (25)	4, 6, 8, 11 and 13	CLO-1,3, CLO-2,3, CLO-4,5, CLO-6
	On line Assignments	1	2 % (2)	6	CLO-1,3, CLO-2,3, CLO-4,5, CLO-6 , CLO-7,8
	On site Assignments	5	2 % (10)	4, 6, 10, 12, and 14	CLO-1,3, CLO-2,3, CLO-4,5, CLO-6 , CLO-7,8
	Projects / Lab.	0	0% (0)		
	Report	1	3 % (3)	10	CLO-1, CLO-2, CLO-3, CLO4
Summative assessment	Midterm Exam	2hr	10% (10)	14	CLO-1, CLO-2, CLO-3, CLO4, CLO5, CLO-6

	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Strength of Materials
Week 2	Normal Stress
Week 3	Shear Stress, Bearing Stress
Week 4	Thin Walled Cylinders (Pressure Vessels) + quiz
Week 5	Simple Strain , Stress-Strain Diagram, Hooke's Law
Week 6	Statically Indeterminate Problems
Week 7	Statically Indeterminate Problems
Week 8	Shear and Moment in Beams (Introduction, Supports and Load) + quiz
Week 9	Area Method for Drawing Shear and Moment Diagram
Week 10	Area Method for Drawing Shear and Moment Diagram
Week 11	Shear and stress in beams+ quiz
Week 12	Shear Stresses in Beams
Week 13	Flexural Stresses in Beams+ quiz
Week 14	Beam Deflections (Double Integration Method) + term exam
Week 15	Beam Deflections (Double Integration Method)
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	

Week 6	
Week 7	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	F. L. Singer and A. Pytel , Strength of materials , 3ed edition, 1980	Yes
Recommended Texts	- Pytel and J. Kiusalaas, Mechanics of materials , 2nd edition ,2012, Library of Congress. - K.S. Yadav , Strength of materials, 2nd edition , 2018, ISBN: 978-81-89401-50-4.	Yes
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Engineering Hydrology		Module Delivery	
Module Type	Support		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	ENV216			
ECTS Credits	3			
SWL (hr/sem)	75			
Module Level	2	Semester of Delivery		3
Administering Department	ENV8	College	ENG4	
Module Leader	Aaisha Mohand Almokhtar		e-mail	aaisha.21enp45@student.uomosul.edu.iq
Module Leader's Acad. Title			Module Leader's Qualification	
Module Tutor	-----		e-mail	
Peer Reviewer Name	-----		e-mail	
Scientific Committee Approval Date	12/9/2024	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	-----
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The aim of this course is to introduce the students to the area of hydrological processes and practices including introduction to the Hydrology. The course will cover discussion of the basic physical principles of the water cycle, different climate factors and components (evaporation, condensation, precipitation, runoff, stream flow). At the end of the course the students will have a working knowledge for estimating Precipitation in different methods as well as Abstraction from Precipitation, Stream flow Measurement, Run-Off, Hydrograph, and Flood Routing and have the skills of analytical skills (analyze data collected in the field and examine the results) and Communication skills (prepare detailed reports that document their research methods and findings). This will be achieved through descriptive lectures with Preparing hydrological reporting and supervised tutorials.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. CLO-1: Recognize the water issues and natural phenomena of different hydrologic process (i) CLO-2: Apply the basic engineering concepts to solve issues associated with hydrologic process (i) CLO-3: Organizing the needed solution, tabulation and calculation for the hydrological problems(i) CLO-4: Deriving standard hydrological relationship Using several methods (i). CLO-5: Report the data obtained from the site visits that will be organized during the Course(iv) CLO-6: Manage risk and uncertainty for flood measurement (vii)
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Introduction and Climate Factors</u> An introduction to the Hydrology. Climate Factors, Precipitation, Abstraction from Precipitation (27 hrs) <u>Part B – Measurements</u> Stream flow Measurement, Run-Off, (9 hrs) <u>Part C – hydrologic details</u> Hydrograph, Flood Routing (9 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course has several components that include lectures, individual & group assignments, field visits and e-learning platforms. Exercises involving the use of computer applications tools to understand the hydrologic processes. The course will be taught in English in addition to the Arabic, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.

Student Workload (SWL) الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8

الفصل			
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	4% (16)	4,6,11,14	CLO-1, CLO-2, CLO-6
	Online assignments	4	2% (8)	4,7,12,14	CLO-2, CLO-3, CLO-4, CLO-5
	On site assignments	4	2% (8)	3,6,9,12	CLO-1, CLO-2, CLO-3, CLO-4
	Report	2	4% (8)	7, and 14	CLO-2, and CLO-6
Summative assessment	Midterm Exam	2hr	10% (10)	10	CLO-1, CLO-2, CLO-3, CLO-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100%(100Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction, objectives, definition of hydrology, branch of Hydrology, hydrological cycle, Hydrological Budget Equation, Engineering Hydrology Application, Typical Failure Factors for Hydraulic Installations, Source of Data.
Week 2	Climate Factors, Temperature, Solar Radiation, Evaporation, Humidity, Vapor Pressure, Wind.
Week 3	Precipitation, Forms of Precipitation, Measurement of precipitation, Types of rain gauge
Week 4	Errors in rainfall measurement, Precipitation Gage Network, adequacy of rain measurement stations, Preparation of data, Methods for calculating missing information, Test for Consistency of Records.
Week 5	Average Precipitation over Area, Accumulated Rainfall, Hyetograph, Rainfall Intensity, Probable Maximum Precipitation, Point Rainfall, Depth- area- duration –Relationship, Depth-Area-Duration, Intensity –Duration – Return period relation.
Week 6	Abstraction from Precipitation, Losses from precipitation, Evaporation, Evaporimeter, Types of evaporation

	meters, Class A Evaporation Pan, Pan Coefficient.
Week 7	Evaporation Measurement Stations, Empirical Evaporation Equations, Analytical methods for estimating evaporation, Types of evaporation meters, reducing evaporation from tanks
Week 8	Evapotranspiration, Potential Evapotranspiration, vapotranspiration Equations, Penman Equation, Blaney – Criddle formula, Evapotranspiration Equations
Week 9	Infiltration, Measurement of Infiltration, Infiltration Capacity, Infiltration Capacity Values, Infiltration Indices.
Week 10	Stream flow measurement, Water stage, time curve-Stage , Stream measurement, Measurement of velocity, Calibration, Equalization of the current meter device, steps for measuring discharge by speed- area method.
Week 11	chemical methods for measuring discharge, indirect method and classified into two types: 1- Flow measurement facilities 2- Slope- Area method, calibration curve in case of unsteady flow.
Week 12	Run – off, Factors affecting the volume of runoff, Direct Runoff, Base Flow, annual runoff volume, Empirical Equation, Rational method, Unit hydrograph, CN-SCS method, Flow- Duration Curve, Flow– Mass Curve, Calculation of Maintainable Demand
Week 13	Hydrograph, Surface Runoff, Inter Flow, Base Flow, Hydrograph component, Factors affecting flood hydrograph, Direct Runoff.
Week 14	Base Flow, Base Flow Separation, Effective Rain, Unit Hydrograph, Unit Hydrograph Assumptions, Unit Hydrograph Derivation, Unit Hydrograph for Different Duration, S - Curve Method , Uses and limitations of standard hydrograph.
Week 15	Flood Routing, Hydrologic Storage Routing, Hydrologic Channel Routing.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1-2	
Week 5-6	
Week 7-8	
Week 9-10	
Week 10-11	
Week 13-14	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	K. Subramana, “ENGINEERING HYDROLOGY”, Second Edition Mc Graw hill, New Delhi, 1997	Yes

Recommended Texts	Linsely , R.K., M .A . Kohlerand Paulhus. “HYDROLOGY OF ENGINEERING”, McGraw-Hill, Singapore, 1988	Yes
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title اسم المنهج	جرائم حزب البعث في العراق		Module Delivery
Module Type نوع المنهج	اساسي		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code رمز المنهج	UOM2050		
ECTS Credits عدد الوحدات	2		
SWL (hr/sem) الحمل الكلي	50		
Module Level / المستوى		UGII	
Administering Department القسم الإداري		ENV8	College الكلية
Module Leader اسم التدريسي		نهال عبد الوهاب حامد	e-mail البريد الإلكتروني
Module Leader's Acad. Title		مدرس مساعد Assistant Lecture	Module Leader's Qualification
Module Tutor		نهال عبد الوهاب حامد	e-mail
Peer Reviewer Name		نهال عبد الوهاب حامد	e-mail
Scientific Committee Approval Date		30/09/2024	Version Number
Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	لا يوجد	Semester	
Co-requisites module	لا يوجد	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- التعرف على الجرائم التي ارتكبتها النظام البعثي في العراق 2- الالمام بمعرفة الجرائم وأنواعها 3- التوعية والتعريف بخطورة الجرائم 4- تعزيز قدرة الطالب على تحليل سياسة النظام الحاكم
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	COL-1: توثيق الانتهاكات والجرائم التي ارتكبتها نظام البعث COL-2: توضيح المعاناة التي مر بها الضحايا COL-3: تعزيز القيم الانسانية مثل الديمقراطية وحقوق الانسان وسيادة القانون COL-4: تعزيز ثقافة المساءلة عن الجرائم والانتهاكات مما يعزز من دور القانون في المجتمع
Indicative Contents المحتويات الإرشادية	الفصل الاول جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005م 1- مفهوم الجرائم واقسامها 2- تعريف الجريمة لغة واصطلاحا 3- اقسام الجرائم 4- انواع الجرائم الدولية 5- القرارات الصادرة من المحكمة الجنائية العليا الفصل الثاني الجرائم النفسية والاجتماعية وآثارها وابلرز انتهاكات النظام البعثي في العراق الجرائم النفسية آليات الجرائم النفسية آثار الجرائم النفسية الجرائم الاجتماعية عسكرة المجتمع موقف النظام البعثي من الدين انتهاكات القوانين العراقية صور انتهاكات حقوق الانسان وجرائم السلطة بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث أماكن السجون والاحتجاز لنظام البعث الفصل الثالث الجرائم البيئية لنظام البعث في العراق 1- التلوث الحربي والاشعاعي وانفجار الالغام 2- تدمير المدن والقرى (سياسة الارض المحروقة) 3- تجفيف الاهوار 4- تجريف بساتين النخيل والاشجار والمزروعات الفصل الرابع 1- جرائم المقابر الجماعية 2- أحداث مقابر الابادة الجماعية المرتكبة من النظام البعثي في العراق 3- التصنيف الزمني لمقابر الابادة الجماعية في العراق للمدة 1963-2003م

Learning and Teaching Strategies					
استراتيجيات التعلم والتعليم					
Strategies الاستراتيجيات		توسيع مدارك الطالب لمفهوم الجريمة واسلوبها وطرق استخلاص الدروس والعبر من الجرائم والانتهاكات التي ارتكبت خلال فترة حكم حزب البعث			
Student Workload (SWL)					
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا					
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا		2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا		1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل		50			
Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight% (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment التقويم التكويني	Quizzes الكويز	2	4% (8)	3,6	COL-1, COL-2
	Online Assignments	4	2% (8)	3,5,6	CLO-1, CLO-2, CLO-3, CLO-4
	Seminars السمنار	0	0	0	0
	Report التقارير	1	10% (10)	4	CLO-1, CLO-2, CLO-3, CLO-4
	Onsite Assignment واجبات داخل الصف	1	6% (6)	5	COL-2 ,COL-3
Summative Assessment التقويم التلخيصي	Midterm Exam امتحان نصف الفصل	2 hrs	10% (10)	9	CLO-1 to CLO-7
	Final Exam الامتحان النهائي	3 hrs	50% (50)	16	All
Total Assessment / التقويم النهائي			100% (100 Marks)		(100 Marks)
Delivery Plan (Weekly Syllabus)					
المنهاج الاسبوعي النظري					
	Material Covered / المواضيع المغطاة				
Week 1	مفهوم الجرائم واقسامها				

Week 2	انواع الجرائم الدولية
Week 3	الجريمة السياسية
Week 4	الجريمة الاجتماعية
Week 5	جريمة قمع الانتفاضة الشعبانية
Week 6	الجرائم النفسية وآثارها
Week 7	جريمة قمع الانتفاضة الشعبانية
Week 8	الجرائم النفسية وآثارها
Week 9	جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا 2005
Week 10	جرائم احداث الجمعة
Week 11	جرائم المقابر الجماعية وقصف العتبات المقدسة
Week 12	الهجوم الكيميائي على حلبجة
Week 13	استخدام الاسلحة المحرمة دوليا
Week 14	الجرائم البيئية لنظام البعث في العراق
Week 15	أحداث المقابر والابادة الجماعية المرتكبة في النظام البعثي في العراق
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered / المواضيع المغطاة
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text الاسم	Available in the Library? هل متوفر في المكتبة؟
Required Texts المنهج المطلوب	جرائم نظام البعث في العراق	
Recommended Texts المنهج الموصى به	من قبل وزارة التعليم	
Websites المواقع الالكترونية	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group	A - Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	English Language-2		Module Delivery	
Module Type	Support or related learning activity		Theory ☒ Lecture Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOM2022			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	UGII	Semester of Delivery	3	
Administering Department	ENV	College	ENG	
Module Leader	Dr. Hamid Adrees Al-Khashab		e-mail	hamidalkhashab@uomosul.edu.iq
Module Leader's Acad. Title	Instructor	Module Leader's Qualification	Ph.D.	
Module Tutor		e-mail		
Peer Reviewer Name		e-mail		
Scientific Committee Approval Date	01/10/2024	Version Number	2.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	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. 5. Study how to write an academic paragraph.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learn grammar specifically that help student to write and speak. 2. Learn new vocabulary and focus on academic word that related in environmental engineering field. 3. Learn the comprehensive reading. 4. Practice more on listening and speaking. 5. Learn how to write an academic paragraph.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. – <u>English Language</u> • Grammar/ Verb tenses and examples, structure sentence, question words, adverb and adjectives, articles, quantity, phrasal verbs, and comparative & superlatives, and certainty. [18 hrs.] • Practice on comprehensive reading. [4 hrs.] • Practice on Listening and Speaking. [4 hrs.] • Writing an academic paragraph and paraphrasing. [6hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation					
تقييم المادة الدراسية					
		Time/N umber	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	8.11	LO #1, 3, and 5
	Assignments	2	10% (10)	2, 5, 8, 12	All
	OnsitAssignments	1	10%		
	حلقات دراسية	1	10		
Summative assessment	Midterm Exam	1 hr	10% (10)	9	LO # 1-3
	Final Exam	3hr	50% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Grammar / Verb tenses and examples (present, past, future) / Vocabulary / Reading, listening, speaking
Week 2	Grammar/ Verb tenses and examples (present) / Vocabulary / Reading, listening, speaking
Week 3	Grammar/ Verb tenses and examples (past) / Vocabulary / Reading, listening, speaking
Week 4	Grammar/ Quantity/ Vocabulary / Reading, listening, speaking
Week 5	Grammar/ Verb tenses and examples (future) / Vocabulary / Reading, listening, speaking
Week 6	Grammar/ Comparative & Superlatives / Vocabulary / Reading, listening, speaking
Week 7	Grammar/ Verb tenses and examples (present perfect) / Vocabulary / Reading, listening, speaking
Week 8	Grammar/ have to, should / Vocabulary / Reading, listening, speaking
Week 9	Midterm Exam

Week 10	Grammar/ Verb tenses and examples (past perfect) / Vocabulary / Reading, listening, speaking
Week 11	Grammar/ Verb tenses and examples (passive) / Vocabulary / Reading, listening, speaking
Week 12	Grammar/ Verb tenses and examples (present perfect continuous) / Vocabulary / Reading, listening, speaking
Week 13	Writing an academic paragraph / Reading, listening, speaking
Week 14	Grammar/ if condition / Vocabulary / Reading, listening, speaking
Week 15	Writing / Paraphrasing / Reading, listening, speaking

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Headway Pre-Intermediate Student's Book-Fourth Edition	Yes (text book)
	Headway Pre-Intermediate Student's Book-Fourth Edition	Yes
Websites	https://meet.google.com/yof-ngkn-ssc	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Water quality Engineering		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☒ Seminar	
Module Code	ENV221			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	2	Semester of Delivery		4
Administering Department	ENV8	College	ENG4	
Module Leader	Mayada Hazim Mohammed Nadia Afram Yaqoob		e-mail	mayada.hmah@uomosul.edu.iq , n.alrhmany@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.	
Module Tutor	-----		e-mail	E-mail
Peer Reviewer Name	Mayada Hazim	e-mail	mayada.hmah@uomosul.edu.iq	
Scientific Committee Approval Date	26/11/2024	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	The aim of this course is to introduce the students to basic concepts on Water Quality Engineering. The course will cover water resources, 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 : the main goal of this part is to equip students with the expertise and skills necessary for monitoring water quality and analyzing it quantitatively. Also, it incorporates the chemical concepts necessary for managing water quality and reducing pollution. At the end of the course, students will learn how to analyze different water samples and will acquire the necessary expertise and skills to monitor and analyze water quality. This will be achieved through lectures, laboratories and tutorials.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO-1: Identify Principal sources of water pollution (i). CLO-2: Describe the physical, chemical and biological characteristics of water quality and Water quality standards. (i). CLO-3: Apply the principle of mass balance to calculate DO Sag in river (ii). CLO-4: Apply the principle of mass balance of water quality modeling in lake (ii) CLO-5: Understand the Mechanism of pollutant Fate in the environment and Transport processes of pollutants (ii). CLO-6: Understand the modeling of water quality in rivers (i) CLO-7: Reporting information related to one of the topics of water quality (iv) CLO-8: Ability to perform and carryout proper measurement and tests. (iii)
Indicative Contents المحتويات الإرشادية	<u>Theoretical lectures</u> <u>Part A – Water resources and Sources of water pollution</u> Surface water and Ground water, Point sources and non-point sources, Common impurities in water (6 hrs). <u>Part B – Water quality standards and Regulations</u> Physical, chemical and Biological characteristics; Criteria and standards; Law and Regulation clean water Act , Safe drinking water Act , Drinking-water standards(9 hrs) <u>Part C - Water quality management in rivers</u> Assimilative capacity , Waste discharges and receiving water ,Management of waste loads and assimilative capacity of receiving waters. DO Sag curve, Mass-Balance Approach, DO Sag Equations, Management Strategy of water quality (9 hrs). <u>Part D - Water quality management in Lakes</u> Thermal Stratification of lakes and turn over, Lake productivity, Eutrophication, Control of phosphorus in lakes; Water quality model in lake(6 hrs). <u>Part E- Ground water quality</u> Types of contaminants that can pollute an aquifer, Contaminant Migration in Groundwaters (3 hrs).

	<u>Part F- Mechanism of pollutant Fate in the environment</u> mechanisms responsible for transporting pollutants in the river; Transport processes; initial mixing; Longitudinal dispersion; Governing equation (6 hrs). <u>Part G- Modeling of water quality in natural systems</u> Types of water quality models, water quality modelling in riverine systems and Water quality index (6 hrs). <u>Practical labs</u> <u>Part A-</u> Introduction, sampling and River, lake and industrial waste samples collection (4 hrs). <u>Part B- Physical tests</u> Total Solid, Dissolved Solid, Suspended Solid, PH-meter, Electrical Conductivity, Turbidity, (12 hrs). <u>Part C- Chemical tests</u> Hardness, Ca^{+2}, and Mg^{+2} , Sulphates, Chlorides, Alkalinity, Chemical Oxygen Demand (COD), Dissolved Oxygen (DO), Biochemical oxygen Demand (BOD), Nitrate and Phosphate(14 hrs).
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	97	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6.5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	175		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	16 % (4)	2, 4, ,8 and 10	CLO-1, CLO-2, CLO-3, CLO-4
	Assignments	3	6 % (2)	3,8 and 11	CLO-2, CLO-3, CLO-4, CLO-5and CLO-6
	Lab.	1	15 % (15)	13	All
	Report	1	3 % (3)		All
Summative assessment	Midterm Exam	2hr	10% (10)	10	CLO-1, CLO -2 and CLO-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Water resources: Introduction, Surface water (rivers, lakes, reservoirs, streams) Ground water (wells, springs).
Week 2	Sources of water pollution: Point sources and non-point sources, Common impurities in water.
Week 3	Physical, chemical and Biological characteristics, Criteria and standards.
Week 4	Irrigation water quality of Criteria and standards, Radioactivity in water.
Week 5	Law and Regulation, clean water Act, Safe drinking water Act, Drinking-water standards.
Week 6	Management of waste loads and assimilative capacity of receiving waters. Effects of pollutant in rivers, Total maximum daily loads (TMDL), Effects of Oxygen –Demanding waste on rivers.
Week 7	Biochemical oxygen-demand, Chemical oxygen demand (COD), Laboratory measurement of biochemical oxygen demand, Addition notes on Biochemical Oxygen Demand, Nitrogen oxidation.
Week 8	DO Sag curve, Mass-Balance Approach, DO Sag Equation, Management Strategy, Nitrogenous BOD, Effect of Nutrients on water quality in rivers.
Week 9	Thermal Stratification of lakes and turn over, Biological zones, Lake productivity, Eutrophication, Algal growth requirement, Control of phosphorus in lakes.
Week 10	Water quality model in lake.

Week 11	Ground water, Types of contaminants that can pollute an aquifer, Darcy equation, Contaminant Migration in Groundwaters.
Week 12	Mechanism of pollutant Fate in the environment: mechanisms responsible for transporting pollutants in the river, Transport processes.
Week 13	Initial mixing, Turbulent Diffusion, Longitudinal Dispersion waste; Governing equation.
Week 14	Modeling of water quality in natural systems: Types of water quality models, An elementary water quality model, water quality modelling in river systems.
Week 15	Water Quality Index, indices of pollution, Formulas use in Determination water quality index; classification of water quality index.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction, sampling.
Week 2	Lab 2: River, lake and industrial waste samples collection
Week 3	Lab 3: Total Solid.
Week 4	Lab 4: Dissolved Solid, Suspended Solid.
Week 5	Lab 5: PH-meter, Electrical Conductivity
Week 6	Lab 6: Turbidity.
Week 7	Lab 7: Hardness, Ca^{+2} , and Mg^{+2}
Week 8	Lab 8: Sulphates
Week 9	Lab 9: Chlorides.
Week 10	Lab 10: Alkalinity
Week 11	Lab 11: Chemical Oxygen Demand (COD)
Week 12	Lab 12: Dissolved Oxygen (DO).
Week 13	Lab 13: Biochemical oxygen Demand (BOD).
Week 14	Lab 14: Nitrate.
Week 15	Lab 15: Phosphate.

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	- 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.	Yes
Recommended Texts	- David A. Chin "Water quality engineering in natural system", John Wiley & Sons, Inc.,2006. - عباوي , سعاد عبد و حسن , محمد سليمان "الهندسة العملية للبيئة -فحوصات الماء" دار ابن الاثير للطباعة للنشر -جامعة الموصل , 1990	Yes
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Concrete & Building Technology		Module Delivery	
Module Type	Support		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	ENV222			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	2	Semester of Delivery		4
Administering Department	ENV8	College	ENG4	
Module Leader	(1) Dr. Omar M. Abdulkareem (2) Mohammed Hisham Shukur		e-mail	(1) omaralhakeem@uomosul.edu.iq (2) M.h.alkafaf@uomosul.edu.iq
Module Leader's Acad. Title	(1) Assistant Professor (2) Lecturer		Module Leader's Qualification	(1) Ph.D. (2) M. Sc.
Module Tutor	-----		e-mail	E-mail
Peer Reviewer Name	-----		e-mail	E-mail
Scientific Committee Approval Date	26/11/2024		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None		Semester
Co-requisites module	None		Semester

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO-1: Identify the concrete composition, classification, characteristics, and mix proportioning (i). CLO-2: Recognize the constituent materials (cement, water, fine and coarse aggregates, and admixtures) in concrete and evaluate how their engineering properties influence the behaviour and performance of the resulting concrete (i). CLO-3: Able to determine the fresh and the hardened properties of the concrete, and understanding concrete performance as a good basics for the building construction and the structural design (ii). CLO-4: Practicing laboratory experiments with execution, compilation and analysis on concrete and its ingredients in addition to the other construction materials (iii). CLO-5: Identify the concepts and principles associated with the building, and technology of construction and be able to evaluate and interpret them using sketches, drawings or in written form (i). CLO-6: Recognize building elements and components in specific situations; how, when and where they would be favoured; and the construction sequence for simple buildings (i). CLO-7: Evaluate the appropriateness of different approaches, materials and construction in simple construction in accordance with building and technology theories and standards, in proportion to the requirements for the structural integrity of buildings (i).
Indicative Contents المحتويات الإرشادية	1- Concrete Technology Topics: a- Topics of Theoretical Part: - Introduction to Concrete: Concrete definition, Concrete composition, Concrete classification, Concrete characteristics, Concrete mix ratios (Conservation of mix weight ratios to volume ratios, Rich and lean concrete mixes) (2 hrs).

- Cement: Cement definition, Manufacture of Portland cement, Chemical composition of Portland cement clinker, Control Ratios, Phase composition of Portland cement clinker, Physical properties of cement (Compressive strength, Setting time, Early stiffening (False set and flash set), Particle size and fineness, Soundness, Consistency, Heat of hydration, Loss on ignition, Density and relative density (Specific gravity), Bulk density), Types of Portland cement (Main types, Blended cements, Special cements) (4 hrs).

- Mixing Water for Concrete: Introduction, Effects of impurities in mixing water on concrete properties (Alkali carbonate and bicarbonate, Chloride, Sulfates, Miscellaneous inorganic salts, Acid waters, Alkaline waters, suspended particles), Organic impurities (Waters carrying sanitary sewage, Sugar, Algae) (2 hrs).

- Aggregates in Concrete: Definition, Characteristics (Particle shape, Surface texture, Bulk density (unit weight) and voids, Relative density (Specific gravity), Absorption and moisture conditions, Alkali-silica reaction (ASR), Sampling, Grading) (4 hrs).

- Chemical Admixtures for Concrete: Definition, Reasons, Classes (Retarding admixtures, Accelerating admixtures, Water-reducing admixtures) (2 hrs).

- Fresh Properties of Concrete: Introduction, Fresh properties (Workability (Factors affecting, Measurement), Segregation, Bleeding, Plastic shrinkage), Composition of fresh concrete (Unit weight (Density), Yield, Cement factor) (6 hrs).

- Hardened Properties of Concrete: Strength (Compressive strength, Factors affecting compressive strength, Tensile strength, Flexure strength, Modulus of elasticity, Poisson's ratio, Shrinkage, Creep) (8 hrs).

b- Topics of Experimental Part:

- An exploratory tour of the construction materials testing laboratory to identify the devices and tests available there in, in addition to how to prepare the engineering report for the experiment according to the relevant structure (2 hrs).

- Standard consistency and initial setting time of the cement paste using Vicat apparatus (2 hrs).

- Compressive strength of the cement mortar cubes and tensile strength of the cement mortar brackets (2 hrs).

- Sieve analysis of the aggregate (Fine and Coarse) (2 hrs).

	- Specific gravity, unit weight, surface moisture, and absorption capacity of the aggregate (4 hrs). - Properties of the fresh concrete (Workability, Proportion of sand, Unit weight) (2 hrs). - Capping, Relationship between the compressive strength of cubic specimen and compressive strength of cylindrical specimen (2 hrs). - Steel reinforcement test (2 hrs). - Masonry units tests (Red clay brick, Concrete block, Terrazzo, and Ceramic tiles) (4 hrs). - Non-destructive tests (Rebound hammer, Core test, Ultrasonic pulse velocity test, Load test) (6 hrs). 2- Building Technology Topics: - General introduction of buildings, Stage of construction buildings, Steps to achieve any engineering project, Development of building construction, Definition and importance of feasibility study (2 hrs). - Earth excavations, Cracking rocks, Groundwater drainage, Soil fillings & compaction (4 hrs). - Foundation depth, Soil & foundation , Types of foundation, Settlement of foundation (4 hrs). - Concrete production: Mixing, Transporting, Placing, Compaction and finishing, Curing, Specifications and precautions (4 hrs). - Types of bricks, Manufacture of bricks, Blocks, Types of build in brick & block, Types of binders (2 hrs). - Types of molds, Loads on mold, Types of scaffolding, Special types of molds (2 hrs). - Lintels, Type of lintels, Columns, Classification of columns (2 hrs). - Load on floors & slabs, Finishing of floors & slabs (2 hrs). - Moisture damages, Moisture proof materials, Treatment of moisture in old buildings (2 hrs). - Finishing of walls from inside & outside, Paintings, General notes of finishing (2 hrs).
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	- Stairs, types of stairs, Moving stairs, Elevators (2 hrs).
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	151		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	12	24% (2)	3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, and 15	All
	Seminar	1	3% (3)	10	All
	Lab./Report	5	5% (1)	1,2,3,4,5,6, 7,8,9,10, 11,12,13,14, and 15	All
	Practical Report	8	8% (1)	1,2,3,4,5,6, 7,8,9,10, 11,12,13,14, and 15	All
Summative	Midterm	2hr	10% (10)	7	CLO-1, CLO-2,

assessment	Exam				CLO-5, CLO-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1 Concrete Technology	Introduction to Concrete: Concrete definition, Concrete composition, Concrete classification, Concrete characteristics, Concrete mix ratios (Conservation of mix weight ratios to volume ratios, Rich and lean concrete mixes).
Week 1 Building Technology	General introduction of buildings, Stage of construction buildings, Steps to achieve any engineering project, Development of building construction, Definition and importance of feasibility study.
Week 2 Concrete Technology	Cement: Cement definition, Manufacture of Portland cement, Chemical composition of Portland cement clinker, Control Ratios, Phase composition of Portland cement clinker, Physical properties of cement (Compressive strength, Setting time, Early stiffening (False set and flash set), Particle size and fineness.
Week 2 Building Technology	Earth excavations, Cracking rocks.
Week 3 Concrete Technology	Cement: Soundness, Consistency, Heat of hydration, Loss on ignition, Density and relative density (Specific gravity), Bulk density), Types of Portland cement (Main types, Blended cements, Special cements).
Week 3 Building Technology	Groundwater drainage, Soil fillings & compaction.
Week 4 Concrete Technology	Mixing Water for Concrete: Introduction, Effects of impurities in mixing water on concrete properties (Alkali carbonate and bicarbonate, Chloride, Sulfates, Miscellaneous inorganic salts, Acid waters, Alkaline waters, suspended particles), Organic impurities (Waters carrying sanitary sewage, Sugar, Algae).
Week 4 Building Technology	Foundation depth, Soil & foundation.
Week 5 Concrete Technology	Aggregates in Concrete: Definition, Characteristics (Particle shape, Surface texture, Bulk density (unit weight) and voids, Relative density (Specific gravity).
Week 5 Building Technology	Types of foundation, Settlement of foundation.
Week 6 Concrete Technology	Aggregates in Concrete: Absorption and moisture conditions, Alkali-silica reaction (ASR), Sampling, Grading.
Week 6 Building Technology	Concrete production: Mixing, Transporting, Placing.

Technology	
Week 7 Concrete Technology	Chemical Admixtures for Concrete: Definition, Reasons, Classes (Retarding admixtures, Accelerating admixtures, Water-reducing admixtures).
Week 7 Building Technology	Concrete production: Compaction and finishing, Curing, Specifications and precautions
Week 8 Concrete Technology	Fresh Properties of Concrete: Introduction, Fresh properties (Workability (Factors affecting, Measurement).
Week 8 Building Technology	Types of bricks, Manufacture of bricks, Blocks, Types of build in brick & block, Types of binders.
Week 9 Concrete Technology	Fresh Properties of Concrete: Segregation, Bleeding.
Week 9 Building Technology	Types of molds, Loads on mold, Types of scaffolding, Special types of molds.
Week 10 Concrete Technology	Fresh Properties of Concrete: Plastic shrinkage, Composition of fresh concrete (Unit weight (Density), Yield, Cement factor).
Week 10 Building Technology	Lintels, Type of lintels, Columns, Classification of columns.
Week 11 Concrete Technology	Hardened Properties of Concrete: Strength (Compressive strength, Factors affecting compressive strength).
Week 11 Building Technology	Load on floors & slabs, Finishing of floors & slabs.
Week 12 Concrete Technology	Scientific Visit.
Week 12 Building Technology	
Week 13 Concrete Technology	Hardened Properties of Concrete: Tensile strength, Flexure strength, Modulus of elasticity, Poisson's ratio.
Week 13 Building Technology	Moisture damages, Moisture proof materials, Treatment of moisture in old buildings.
Week 14 Concrete Technology	Hardened Properties of Concrete: Shrinkage, Creep.
Week 14 Building Technology	Finishing of walls from inside & outside, Paintings, General notes of finishing.
Week 15	Hardened Properties of Concrete: Creep.

Concrete Technology	
Week 15 Building Technology	Stairs, types of stairs, Moving stairs, Elevators.
Week 16	Final Exam.

Delivery Plan (Weekly Lab. Syllabus)		
المنهاج الاسبوعي للمختبر		
	Material Covered	
Week 1	An exploratory tour of the construction materials testing laboratory to identify the devices and tests available there in, in addition to how to prepare the engineering report for the experiment according to the relevant structure.	
Week 2	Standard consistency and initial setting time of the cement paste using Vicat apparatus.	
Week 3	Compressive strength of the cement mortar cubes and tensile strength of the cement mortar brackets.	
Week 4	Sieve analysis of the aggregate (Fine and Coarse).	
Week 5	Specific gravity, unit weight, surface moisture, and absorption capacity of the aggregate.	
Week 6		
Week 7	Properties of the fresh concrete (Workability, Proportion of sand, Unit weight).	
Week 8	Capping, Relationship between the compressive strength of cubic specimen and compressive strength of cylindrical specimen.	
Week 9	Steel reinforcement test.	
Week 10	Masonry units tests (Red clay brick, Concrete block, Terrazzo, and Ceramic tiles).	
Week 11		
Week 12	Scientific Visit.	
Week 13	Non-destructive tests (Rebound hammer test).	
Week 14	Non-destructive tests (Core test).	
Week 15	Non-destructive tests (Ultrasonic pulse velocity test, Load test).	
Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	S. H. Kosmatka and M. L. Wilson, Design and Control of Concrete Mixtures, Portland Cement Association, Fifteenth Edition Print History, USA, 2011. Z. Sacko and A. Levon, Buildings Construction,	Yes

	University of Baghdad, College of Engineering, Department of Civil Engineering, Iraq, 2007.	
Recommended Texts	G. Owens, Fulton's Concrete Technology, Cement & Concrete Institute, Printing and Binding by Intrepid Printers (Pty) LTD, Midrand (South Africa), 2009.	Yes
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Survey Applications and GIS		Module Delivery
Module Type	S		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ENV223		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	LEVEL 2	Semester of Delivery	4
Administering Department	ENV8	College	ENG4
Module Leader	Dr. Kaythar A. Ibrahim	e-mail	Kaythar6871@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Profissor	Module Leader's Qualification	Ph.D.
Module Tutor	Prof. Sabah Hussein Ali Mr. Ahmed Yassen Shehab	e-mail	sabah196004@uomosul.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/12/2024	Version Number	1

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The semester aims to teach students how to deal with an ArcGIS10.6 program So that the student can open the windows of the program, import spatial and vector data, and editing this data, as well as adding and updating new field data. In addition, semester aims to teach students global position systems (GIS). The course also aims to teach students how to use the total station device to upload surveys and drop maps
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO-1 Learning maps modeling through the elements of the arcgis10.6 program CLO-2 Learning how to adjust the geodes system of maps and site using GPS CLO-3 Using Total Station in surveying works.
Indicative Contents المحتويات الإرشادية	GIS was created to solve problems. Using GIS in education helps students frame, visualize, and grapple with problems. It even enables students to create solutions to those problems, whether they are about natural hazards, climate, urban greenways, litter, energy, social inequity, or other complex issues of our day

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	This course has several components that include classes & lecture exams. The Arabic language is adopted in this course

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)		CLO-1, CLO-2
	Online assignments	2	10%(10)		CLO-1, CLO-2
	On site assignments	0			
	Projects / Lab.	5	20% (20)		ALL
Summative assessment	Midterm Exam		10% (10)		CLO-1, CLO-2
	Final Exam		50%(50)		All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered (Surveying Application)
Week 1-2	Introduction to the total station. How to calculate coordinates and Total Station
Week 3-4	Explaining the main components of Total station and how to prepare it for work
Week 5-6	Setting up the total station through the station's coordinates and angle.
Week 7-8	Setting up the total station through the station's coordinates and another point
Week 9-10	Setting up the total station through required point and angle (Local Resection)
Week 11-12	Setting up the total station through two points coordinates (Resection) Surveying & setting out
Week 13-15	Surveying & setting out

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered (GIS)
Week 1-2	Introduction to GIS What's GIS, the historical development, the application and Importance of GIS
Week 3-4	Difference between Raster and vector
Week 5-6	Review of the ArcGIS10.6 windows and the installation methods

Week 7-8	Created shape files of line, polyline and polygon for wells and towers
Week 9-10	Spatial and attribute tables
Week 11-12	How to add field to attribute tables
Week 13-15	GPS and geodetic system
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Geographical Information System (Arabia Saudi). Leica FlexLine TS02/TS06/TS09 User manual	
Recommended Texts	GIS and Remote sensing .. principle and application	
Websites	https://www.facebook.com/Hatem.Tarek.G	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Microbiology	Module Delivery	
Module Type	Support	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	ENV224		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2		
Administering Department	ENV8	College	ENG4
Module Leader	Dr. Shafaq Tariq Burhan	e-mail	Shasbio108@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PhD
Module Tutor	Waad Mohammed Ali Abbas Nadia Afram Yaqoob Aya Thamer Ibrahim Aisha Mohanad Yahya	e-mail	waadd1976@uomosul.edu.iq n.alrhmany@uomosul.edu.iq aya.thamer@uomosul.edu.iq aisha.almokhtar@uomosul.edu.iq
Peer Reviewer Name	-----	e-mail	E-mail
Scientific Committee Approval Date	12/10/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	In Environmental Microbiology, initially students will learn how to deal with different types of microorganisms and it's useful in designing wastewater and water treatment plant .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. CLO-1: How classify the microorganism. CLO-2: The structure of microorganism. CLO-3: Bacterial Morphologies. CLO-4: Identification of microorganisms and their activities. CLO-5: How to disinfect drinking water from pathogens. CLO-6: How to induce water pollution by pathogens. CLO-7: How waste water is treated biologically using microorganisms. CLO-8: Factors affecting on microorganisms. CLO-9: Learning everything regarding microorganisms that may be need them in other environmental engineering subjects in next stages. CLO-10: How to use the microscope. CLO-11: How to test the pollution indicators in water. CLO-12: How to test E. Coli in water samples. CLO-13: Gram staining procedure.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A: Introduction to Microbiology as a science Microorganisms as cells Microorganisms and their natural environments Impact of microorganisms on humans A brief history of microbiology and recent advances. Part B: The scope of microbial diversity is enormous and microorganisms have exploited every means of making a living consistent with the laws of chemistry and physics Part C: The “Central Dogma” relates how biological information flows through a cell by a series of macromolecules that are governed by chemical actions. Part D: Microbial ecology – study of the interaction of microorganisms with each other and their environment .

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	To enhance the understanding of microbial function in engineering system, initially students must be learned how to deal with different types of microorganisms and it's useful in designing wastewater and water treatment plant. Also microorganisms play an important role in the protection of humans, animals, plants, air, soil, and engineer in systems from chemical or biological pollution, deterioration, and corrosion, and in the restoration polluted and degraded environments.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	16 % (16)	2, 3, ,12 and 14	CLO-1, CLO-2, CLO-3, CLO-5
	Assignments	5	10 % (10)	2, 3, 4, 6, and 10	CLO-2, CLO-2, CLO-3, CLO-2, CLO-3
	Projects / Lab.	6	10% (10)	13	CLO-2 to CLO-6
	Report	1	4 % (4)		All
Summative assessment	Midterm Exam	2hr	10% (10)	7	CLO-1, CLO -2 and CLO-3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1&2	Introduction to Microbiology Why we are concerning for studying Environmental Microbiology, and Germ theory.
Week 3	Classification the microorganisms Studying different types of classifications of microorganisms and Bacterial morphologies.
Week 4&5	Bacterial cell chemistry Studying microorganisms cell structure and cell chemistry.
Week 6&7	Bacterial growth in batch system and continuous flow system Expecting the number of generated bacteria and effect of reactor type on it, also substrate and other components effects on the microorganism's activities, as well as mass balance.
Week 8	Microorganisms in water and bacterial content The types of pathogens and its indicators, standards specifications of drinking water.
Week 9	Detection of evidence of water contamination Coliform and fecal bacteria, viruses.
Week 10&11	Use the microscope and prepare the slides for examination Laboratory lectures for practical testing.
Week 12	Most probability number test for coiform bacteria The most important test for environmental engineers for pollution indicators
Week 13&14	Biological treatment Role of microorganisms in biological treatment of wastewater and the factors that effect on microorganisms activities in wastewater.
Week 15	Review before the final Exam

Delivery Plan (Weekly Lab. Syllabus)		
المنهاج الاسبوعي للمختبر		
	Material Covered	
Week 1	Laboratory Safety	
Week 2	Sterilization and Disinfection	
Week 3	The microscope	
Week 4 & 5	Shapes of bacteria	
Week 6 & 7	Gram staining procedure	
Week 8 & 9	Handling of bacteria cultures	
Week 10 & 11	Examination of indicator organisms in water	
Week 12 & 13	Final exam	
Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	● Environmental Microbiology for Engineers’ by Volodymyr Ivanov.	Yes
Recommended Texts	● Environmental microbiology-Academic Press (2014), by Ian L Pepper, Charles P Gerba and Terry J Gentry ● Principles of Environmental Engineering and Science, Mackenzie L. Davis and Susan J. Masten.	Yes
	APHA, AWWA, WPCF “Standard method for the examination of water and wastewater”, 1985.	
	Laboratory Exercises in Microbiology , Joan Petersen and Susan McLaughlin, City University of New York, CUNY Academic Works , 2016	
	"Practical Microbial physiology", Nawal M. Otba and et. al., Department of Biology, College of Science, University of Baghdad, 2021.	
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title اسم المنهج	اللغة العربية		Module Delivery
Module Type نوع المنهج	اساسي		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar
Module Code رمز المنهج	UOM2012		
ECTS Credits عدد الوحدات	2		
SWL (hr/sem) الحمل الكلي	50		
Module Level / المستوى	2	Semester of Delivery / سحب المنهج	
Administering Department القسم الإداري	هندسة السدود والموارد المائية	College الكلية	الهندسة
Module Leader اسم التدريسي	هدى رعد شريف	e-mail البريد الالكتروني	huda.shareef@uomosul.edu.iq
Module Leader's Acad. Title	-----	Module Leader's Qualification	-----
Module Tutor	-----	e-mail	-----
Peer Reviewer Name	-----	e-mail	E-mail-----
Scientific Committee Approval Date	21/10/2024	Version Number	2.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	لا يوجد	Semester	
Co-requisites module	لا يوجد	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	الهدف من هذا الفصل الدراسي هو تمكين الطالب من القراءة الصحيحة، وأن يكتسب القدرة على استعمال اللغة استعمالاً صحيحاً في الاتصال مع الآخرين؛ كالسرعة وجودة الإلقاء وحسن التعبير، وتعويد حسن الاستماع وتنمية الذوق الأدبي لدى الطالب وتعويد على التعبيرات السليمة الواضحة.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO1: تعريف الطالب بضرورة ممارسة قواعد الكتابة والكلام باللغة العربية الفصيحة. CLO2: تعريف الطالب بمستويات نظام اللغة العربية CLO3: تعميق اتصال الطالب بالتراث العربي والإسلامي. CLO4: تعزيز البحث العلمي في مجال اللغة العربية وعلومها لإعداد الدراسات والبحوث. CLO5: إظهار جمال اللغة العربية واتساع معانيها واساليبها الإنشائية. CLO6: تمكين الطالب من تجاوز الأخطاء اللغوية وتصحيحها. CLO7: تنمية الذوق الأدبي لدى الطالب لإدراك النواحي الجمالية في أسلوب الكلام وصوره ومعانيه. CLO8: التعرف بأبرز شعراء العصر العباسي.
Indicative Contents المحتويات الإرشادية	الجزء الأول: (6 ساعات) • قواعد اللغة العربية (النحو) • المبتدأ والخبر • نواسخ المبتدأ والخبر الجزء الثاني: (6 ساعات) • كان واخواتها • إن واخواتها • ظن واخواتها الجزء الثالث: (6 ساعات) • الامتحان الفصلي • الأسماء المنصوبة • المفعول المطلق الجزء الرابع: (4 ساعات) • الأخطاء اللغوية • الأملاء الجزء الخامس: (8 ساعات) • الادب في العصر العباسي • الشاعر المتنبي • الشاعر أبو تمام • الشاعر أبو فراس الحمداني
Learning and Teaching Strategies	

استراتيجيات التعلم والتعليم					
Strategies الاستراتيجيات		إنَّ الغاية الأساسية من دروس اللغة العربية هو القضاء على الصعوبة والجمود الذي قد يصاحب مواضيع بعض هذه الدروس، بالإضافة إلى إيصال الأفكار والمعلومات المطلوبة إلى الطلاب بطرق مفهومة وتناسب الفروقات الفردية بينهم، ومن أبرز ما تم التركيز عليه في المحاضرات هو قواعد اللغة العربية والأدب وتتمثل الدراسة بالمحاضرات والامتحانات والواجبات داخل الصف والمناقشة والواجبات المنزلية.			
Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا					
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل		33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا		2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل		17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا		1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل		50			
Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment التقويم التكويني	Quizzes الكويز	3	5% (15)	4,8 and 10	All
	H.W Assignments الواجبات البيتية	2	5% (10)	6, 7	CLO4, CLO5, and CLO6
	Seminars السمنار	1	5% (5)	12	All
	On-site Assignment واجبات داخل الصف	2	5% (10)	6, 10	CLO4, CLO5, and CLO6
Summative Assessment التقويم التلخيصي	Midterm Exam امتحان نصف الفصل	2 hrs	10% (10)	7	All
	Final Exam الامتحان النهائي	3 hrs	50% (50)	16	All
Total Assessment / التقويم النهائي			100% (100 Marks)		
Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري					
	Material Covered / المواضيع المغطاة				
Week 1	قواعد اللغة العربية (النحو)				
Week 2	المبتدأ والخبر				
Week 3	نواسخ المبتدأ والخبر				

Week 4	كان واخواتها
Week 5	إن واخواتها
Week 6	ظن واخواتها
Week 7	الامتحان الفصلي
Week 8	الأسماء المنصوبة
Week 9	المفعول المطلق
Week 10	الأخطاء اللغوية
Week 11	الأملاء
Week 12	الادب في العصر العباسي
Week 13	الشاعر المتنبي
Week 14	الشاعر أبو تمام
Week 15	الشاعر أبو فراس الحمداني
Week 16	الامتحان النهائي

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered / المواضيع المغطاة
Week 1	لا يوجد
Week 2	لا يوجد
Week 3	لا يوجد
Week 4	لا يوجد
Week 5	لا يوجد
Week 6	لا يوجد
Week 7	لا يوجد

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text الاسم	Available in the Library? هل متوفر في المكتبة؟
Required Texts المنهج المطلوب	النحو الوافي / عباس حسن	نعم
Recommended Texts المنهج الموصى به	في الأدب العباسي / محمد مهدي البصير	نعم
Websites المواقع الالكترونية	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors

	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer2		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOM2032		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	2	Semester of Delivery	2
Administering Department	ENV8	College	ENG4
Module Leader	Abeer Khalil Ibraheem Dr. Samir saadi yasso	e-mail	Abeer.alsaraf@uomosul.edu.iq syasso@uomosul.edu.iq
Module Leader's Acad. Title	Assist Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Abeer Khalil Ibrahim	e-mail	abeer.alsaraf@uomosul.edu.iq
Peer Reviewer Name	Abeer Khalil Ibraheem	e-mail	Abeer.alsaraf@uomosul.edu.iq
Scientific Committee Approval Date	19/10/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The Module aim is to utilize the fundamental concepts and applications of Artificial Intelligence, machine learning, and neural networks. The course emphasizes both theoretical foundations and practical implementations using tools such as MATLAB

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2. An ability to acquire and apply new knowledge and using appropriate learning strategies. 3. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 4. It is expected from the student who passes this module learn the computer components, security and networking, computer troubleshooting. 5. learning the application of AI.
Indicative Contents المحتويات الإرشادية	Security and netwrking [6 hr] E-commerce [4 hr] computer troubleshooting [6 hr] Memory type [6 hr] Introduction to AI [6 hr] application of AI.[8] learning the basic of MATLAB program.[6 hr] matrices in MATLAB . [6 hr] Monthly LAB Exam [3 hr] Applied examples using MATLAB. [6 hr]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the Lab activities, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, laboratory and by considering type of external search involving some of computer technology that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	50	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3.3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	25	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (10)	4, 11	LO #Q1: 1-2, Q2: 7-9
	Assignments	2	2% (4)	3, 10	LO #A1: 1-2, A2: 7-9
	Lab.	3	6% (18)	5,8,12	All
	seminar	1	8% (8)	7,8	All
Summative assessment	Midterm Exam	2 hr	10% (10)	9	All
	Final Exam	3hr	50% (50)		
Total assessment			(100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	computer hardware and software, Software and Hardware Interaction
Week 2	Security and networking , what is the network, network types.
Week 3	Basic network components
Week 4	e-commerce, concept of electronic banking services, phone banking, SMS banking
Week 5	Computer troubleshooting
Week 6	Basic troubleshooting technique and tools
Week 7	Introduction to AI, Define AI
Week 8	AI technique and approaches
Week 9	Monthly Exam
Week 10	ethical consideration
Week 11	AI in our daily lifes
Week 12	Application of AI , education, healthcare, marketing.
Week 13	AI and society
Week 14	challenges of AI
Week 15	The future of AI
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Introduction to MATLAB, Understanding the MATLAB interface, Using the Command Window.
Week 3,4	Programming Basics in MATLAB, Variables and data types, Arithmetic and logical operation
Week 5,6,7	Matrices in MATLAB, Creating 1D and 2D matrices
Week 8,9	Solving Equations Using Matrices
Week 10	Control Flow – Learning the if Statement
Week 11	Monthly Exam
Week 12,13	Loops Using for
Week 14,15	Simple Practical Projects

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	2015 Computer Literacy BASICS: A Comprehensive Guide to IC3 Connie Morrison, Dolores Wells, Lisa Ruffolo Cengage Learning. ISBN: 128576658X	Available as PDF
Recommended Texts	Ahmed Banafa { introduction to Artificial Intelligence (AI)} 1'st addition (2024) مدخل الى عالم الذكاء الاصطناعي (2005) الدكتور عادل عبد النور	Available as PDF
Websites	Google Classroom	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
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المقررات الدراسية / كلية الهندسة / جامعة الموصل

المستوى الثالث للعام الدراسي 2021-2022

قسم هندسة البيئة

المستوى الدراسي الثالث (الفصل الاول)									
اسم المتطلب	نوع المتطلب (اجباري - اختياري)	اسم المقرر		عدد الساعات النظرية	عدد الساعات العملية	عدد الوحدات	الممهد ان وجد	رمز المقرر	الملاحظات
		باللغة العربية	باللغة الإنكليزية						
متطلبات الكلية	اجباري	سلامة عامة	public safety	2	-	2		ENGE329	اجباري لطلبة القسم
	اختياري	تحليلات عددية	Numerical Analysis	2	-	2	رياضيات 2	ENGE320	
متطلبات القسم	اجباري	شبكات اسالة	water supply network	3	-	3	ميكانيك الموائع	ENV340	
	اجباري	تطبيقات هيدروليك	hydraulic application	3	-	3	ميكانيك الموائع	ENV341	
	اجباري	ميكانيك تربة	soil mechanics	3	2	4	جيولوجيا البيئة، ميكانيك السكون، ميكانيك الموائع	ENV342	
	اجباري	تلوث الهواء	air pollution	3	-	3	ثرموداينمك البيئة، ميكانيك الموائع، كيمياء عامة، مبادئ هندسة البيئة	ENV343	
	اجباري	هندسة مياه الفضلات	wastewater engineering	2	-	2	هندسة نوعية المياه، كيمياء عامة	ENV344	
	اجباري	بحث هندسي	engineering research	2	-	2		ENV345	
مجموع ساعات ووحدات الفصل الدراسي الأول						20	2	21	

قسم هندسة البيئة

المستوى الدراسي الثالث (الفصل الثاني)								
اسم المتطلب	نوع المتطلب (اجباري - اختياري)	اسم المقرر		عدد الساعات النظرية	عدد الساعات العملية	عدد الوحدات	الممهد ان وجد	رمز المقرر
		باللغة العربية	باللغة الإنكليزية					
متطلبات الجامعة	اجباري	اللغة الإنكليزية - متوسط	English Language - Intermediate	2	-	2		-
متطلبات القسم	اجباري	شبكات الصرف الصحي	Sanitary sewer networks	3	-	3	ميكانيك الموائع	ENV346
	اجباري	هندسة الاسس	Foundation Engineering	3	-	3	ميكانيك تربة	ENV347
	اجباري	كيمياء المياه	Water chemistry	3	-	3	جيولوجيا البيئة، ميكانيك الموائع	ENV348
	اجباري	خرسانة مسلحة	Reinforcement concrete	3	-	3	مقاومة المواد	ENV349
	اجباري	نفايات صلبة	Solid waste	4	-	4	مبادئ هندسة البيئة	ENV350
	اختياري	تلوث الضوضاء	Noise pollution	2	-	2		ENV390
	اختياري	التلوث الحراري والاشعاعي	Thermal pollution	2	-	2	ثرموداينمك البيئة	ENV391
		مجموع ساعات ووحدات الفصل الدراسي الأول		20	-	20		

ملاحظة: التدريب الصيفي (Summer Training) من متطلبات التخرج المطلوبة بعد اكمال الطالب المستوى الثالث للفترة من 1 تموز إلى 31 تموز أو من 1 آب إلى 31 آب.



Course Description Form

1. Course Name:					
Wastewater Engineering					
2. Course Code:					
ENEV344					
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			- The course will cover wastewater characteristics and flow rate focusing on select of design flowrates and mass loading. - Study of kinetic reactions, reactions kinetics and types of reactors. - Identify the types of physical, chemical and biological operating units and their ro in wastewater treatment.		
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
1-3	6	Apply the basic concepts of sciences and engineering to solve issues associated with the treatment of wastewater.	Characteristic of wastewater	In Class Power Point Lectures	home work, daily, termly and course examinations
4-7	6	Formulate the mass balance principles, and applying	Kinetic reactions reactors.		

		Modeling treatment process kinetics involving mass transfer and Gas-Liquid mass transfer.			
8-10	6	Identify the physical operating units and their role in wastewater treatment	physical operating units		
11-12	4	Identify the biological operating units and their role in wastewater treatment.	biological operating units		
13-14	4	Identify the chemical operating units and their role in wastewater treatment.	chemical operation units		

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)	
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., 1300p.
Electronic References, Websites	

Course Description Form

1. Course Name:					
Air pollution					
2. Course Code:					
ENV343					
3. Semester / Year:					
Fall/2024-2025					
4. Description Preparation Date:					
15/09/2024					
5. Available Attendance Forms:					
In Classroom- google classroom					
6. Number of Credit Hours (Total) / Number of Units (Total)					
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		- 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	i,vii	Introduction to the atmosphere: Definition and layers of the atmosphere, air pollution effects	Lecture notes PowerPoint	Quizzes and Home Works

2-3	6	i	Types of air pollutants, their sources and concentrations, classification of air pollutants,	Lecture notes PowerPoints	Quizzes Home Works
4	3	i	Air pollution legalization and amendments	Lecture notes PowerPoints	Quizzes Home Works
5	3	i	Concentration Units and Air Quality Index (AQI)	Lecture notes	
6-7-8-9	12	ii	Air pollution and meteorology: Wind rose, pressure gradients, adiabatic lapse rate, atmospheric stability, radiation inversion, subsidence inversion, atmospheric stability and mixing depth, Smoke plumes patterns.	Lecture notes PowerPoints videos	Quizzes and Home Works Midterm exam
10-1-12-13	12	ii	Mathematical Models: The point source Gaussian plume model, A line-source dispersion model, Area-source models,	Lecture notes PowerPoints	Quizzes Home Works

14-15	6	ii	Indoor air quality model.	Lecture notes	Quizzes 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	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:	
English Language-3	
2. Course Code:	
UOM2022	
3. Semester / Year:	
Spring/2025	
4. Description Preparation Date:	
26 th -9-2024	
5. Available Attendance Forms:	
In-Class	
6. Number of Credit Hours (Total) / Number of Units (Total)	
2	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr.Hamid Adrees Al-Khashab Email: hamidalkhashab@uomosul.edu.iq	
8. Course Objectives	
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 academic paragraph.
9. Teaching and Learning Strategies	
Strategy	Type something like: The main strategy that will be adopted delivering this module is to encourage students' participation the exercises, while at the same time refining and expanding the critical thinking skills. This will be achieved through class interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	1	Grammar / Verb ten and examples (present, past, future) Vocabulary / Reading listening, speaking	In-Class	In-Class Exam
2	2	1	Grammar/ Verb ten and examples (present) Vocabulary / Reading listening, speaking	In-Class	In-Class Exam
3	2	1	Grammar/ Verb ten and examples (past) Vocabulary / Reading listening, speaking	In-Class	In-Class Exam
4	2	1	Grammar/ Quant Vocabulary / Reading listening, speaking	In-Class	In-Class Exam
5	2	1	Grammar/ Verb ten and examples (future) Vocabulary / Reading listening, speaking	In-Class	In-Class Exam
6	2	1	Grammar/ Comparat & Superlatives Vocabulary / Reading listening, speaking	In-Class	In-Class Exam
7	2	1	Grammar/ Verb ten and examples (present perfect) / Vocabulary Reading, listening, speaking	In-Class	In-Class Exam
8	2	1	Grammar/ have should / Vocabulary Reading, listening, speaking	In-Class	In-Class Exam
9	2	1	Midterm	In-Class	In-Class Exam
10	2	1	Grammar/ Verb ten and examples (present perfect) / Vocabulary Reading, listening, speaking	In-Class	In-Class Exam

11	2	1	Grammar/ Verb ten and examples (passi / Vocabulary / Read listening, speaking	In-Class	In-Class Exa
12	2	1	Grammar/ Verb ten and examples (pres perfect continuous) Vocabulary / Read listening, speaking	In-Class	In-Class Exa
13	2	1	Writing an academi paragraph / Read listening, speaking	In-Class	In-Class Exa
14	2	1	Grammar/ if conditio Vocabulary / Read listening, speaking	In-Class	In-Class Exa
15	2	1	Writing / Paraphrasin Reading, listeni speaking	In-Class	In-Class Exa

11. Course Evaluation

10 % Seminar
20% Midterm
5% Quizzes
5% Homework
60% Final

12. Learning and Teaching Resources

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

Course Description Form

1. Course Name: Foundation Engineering	
2. Course Code: ENV347	
3. Semester / Year: 2024- 2025	
4. Description Preparation Date: September -2024	
5. Available Attendance Forms: Attendance	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 / 45	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Mohammed Abdulnaffaa, 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 foundation engineering, which is the application of different laws in terms of how to conduct soil tests - find soil bearing capacity, - design different types of foundations. This will be achieved through descriptive lectures
9. Teaching and Learning Strategies	
Strategy	Educational outcomes, through strategies achieved in times equal to the number of weeks of study. CLO-1: Students will learn how to conduct soil engineering investigations (i) CLO-2: Using soil properties to determine its tolerance and deal with other soil problems. (ii) CLO-3: Conduct appropriate measurements and tests of soil properties and analyze the results to obtain soil bearing capacity. (iii) CLO-4: Students will be able to communicate and collaborate with others to have discussions about choosing appropriate foundations for each type of soil. (v)

	CLO-5: Process and organize data obtained from foundation design during the course. (vi) CLO-6: Form some opinions on emerging foundation engineering issues and try to provide some compatible solutions to the problems related to analysis and design (vii)
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	1	CLO-1	Introduction	E-learning and in-person education	Exams and homework
1-2	5	CLO-1	Soil investigation	E-learning and in-person education	Exams and homework
3-5	9	CLO-1	Soil Bearing capacity	E-learning and in-person education	Exams and homework
6-7	6	CLO-1	Settlement of soil	E-learning and in-person education	Exams and homework
8-9	6	CLO-2	Design of spread footing	E-learning and in-person education	Exams and homework
10-11	6	CLO-2	Design of wall footing	E-learning and in-person education	Exams and homework
12-13	6	CLO-2	Design of combined footing	E-learning and in-person education	Exams and homework
14-15	6	CLO-2	Design of raft foundation	E-learning and in-person education	Exams and homework
16	3	CLO-2	Preparing week for final foundation		

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 and homework (3): 20 marks

2- Semester exam (1): 20 marks

3- -Final exam (1): 60 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...)	
Electronic References, Websites	

Course Description Form

1. Course Name:	
Hydraulic Applications	
2. Course Code:	
ENV341	
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)	
3/3	
7. Course administrator's name (mention all, if more than one name)	
Name: Mohammed Salim Mahmood	
Email: Mohammedsalim@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	On successful completion of this course students will be able to: - Recognize the common hydraulic Applications encountered in environmental engineering (i) - Apply knowledge of hydraulics and fluid mechanics to the analysis and design of hydraulic facilities (ii) - outline the main fluid problems on hydraulic jumps and varied flows. - Apply the equations available for the analysis of flow in pipes and open channels for the solution of practical hydraulic problems. - understand and carry out analysis of open channel flow. - Distinguish between open and closed conduits (i) - define Specific energy, Critical depth, Determination of critical depth for rectangular channel. (i). - solve engineering problems related to Hydraulic gradient and total energy lines, Energy of flowing liquid in open channel, Specific energy of a channel's cross-section. (i) - formulate equations to calculate Time for emptying tank through orifice (i)
9. Teaching and Learning Strategies	
Strategy	This course has several components that include power point lectures, individual assignments, e-learning platforms, classwork.
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	I	Open channel flow -Open channels flow classifications -Development of uniform flow and its formulas (Chezy's and -Manning formulas). -Velocity distribution over cross-section of an open channel.	Power point lecture	Quizzes (term+Final exams)
3	9	I , II	Non-uniform flow in open channels -Hydraulic gradient and total energy lines. -Energy of flowing liquid in open channel. -Specific energy of a channel's cross-section. -Specific energy curve. -Critical depth. -Determination of critical depth for rectangular channel. -Froude number. -Classification of slopes.	Power point lecture	Quizzes (term+Final exams) + Individual Assignments
1	3	I , II	Classification of surface profiles in gradually varied flow -Direct step method. -Transitions -Minor head losses in open channels	Power point lecture	Quizzes (term+Final exams)
2	6	I , II	Flow measurement and hydraulic control points -Sharp crested weirs. -Orifices -Hydraulic control points.	Power point lecture	Quizzes (term+Final exams) +Individual Assignments
3	9	I , II	Pressure Surges "Water Hammer" -Propagation of disturbances in fluids -Gradual closure of valve -Instantaneous closure of valves on elastic and rigid pipes - Calculation of water hammer -Damping devices: -Reservoir -Air chamber -Surge tank	Power point lecture	Quizzes (term+Final exams) +Individual Assignments
3	9	I , II	Hydraulic Similarity and flow similitude Types of similarity Types of forces Generalized similarity Flow Similitude Hydraulic Models	Power point lecture	Quizzes (term+Final exams)
2	6	I , II	Multipoint diffuser outfalls -Types of outfalls -Hydraulics of multipoint diffusers. -Example of multipoint diffusers pipe calculation	e-learning platforms	Quizzes (term+Final exams)

15	45			Total
11. Course Evaluation				
4 quizzes	12 pts			
4 HomeWorks	8 pts			
Term Exam	20 pts			
Final Exam	60pts			
Total	100pts			
12.				
Required textbooks (curricular books any)		Larry D. Benfield "Treatment Plant Hydraulics for Environmental Engineers", Prentice Hall, New Jersey, 1984,		
Main references (sources)		Metcalf and 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		https://4enveng.com/		

Course Description Form

1. Course Name:	
Noise pollution	
2. Course Code:	
ENV390	
3. Semester / Year:	
Spring/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: Ammar Thamir Hamad	
Email: dr.ammarthamir@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	- Identify the sources of noise pollution - Describe the physical properties of sound - Understand the factors affecting noise propagation outdoor - Apply physical characteristics of sound wave in the description of sound propagation in the air - Compare between the concepts involved in noise control technologies - Advise on methods of noise reduction and sound insulation for a range of situations - Design road way barrier used to reduce noise level produced by transportation - Submit a report on noise prediction in a specified road way configuration (Case study)
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	Describe the physical properties of sound	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	Identify the various rating systems used for the description of noise data	Rating systems the Ln concept, the Leq concept	Power point lecture, Case Study	H.W. Assignments +, Report
5-6	4	Understand both hearing and unhearing effect of sounds on peoples	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	Quiz
7-11	10	Understand the factors affecting noise propagation outdoor Apply physical characteristics of sound wave in the	Transmission of sound outdoors Inverse Square Law, Radiation Fields of a Sound Source	Power point lecture, Group Discussion	H.W Assignments, + Quiz

		description of sound propagation in the air Design road way barrier used to reduce noise level produced by transportation	Directivity, Airborne Transmission, Traffic noise prediction		
12-15	8	Compare between the concepts involved in noise control technologies Advise on methods of noise reduction and sound insulation for a range of situations	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	Quiz

11. Course Evaluation

4 quizzes	10 pts
2 homework	4 pts
Case study Report	6 pts
Term Exam	20 pts
Final Exam	60 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%

Instructor

Department Head

Course Description Form

1. Course Name:
Numerical Analysis
2. Course Code:
ENGE320
3. Semester / Year:
Fall 2024
4. Description Preparation Date:
1/10/2024
5. Available Attendance Forms:
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: Salim Yousif Awad Email: sua@uomosul.edu.iq
8. Course Objectives
Numerical Analysis Course Objectives A Numerical Analysis course is designed to provide students with the fundamental concepts and techniques for solving mathematical problems using numerical methods. The primary objectives of the course typically include: 1. Understanding the Basics of Numerical Computation • Introduce the importance of numerical methods in solving real-world mathematical problems. • Explain the sources of numerical errors (e.g., truncation and round-off errors). • Discuss the significance of error analysis in numerical computations. 2. Solving Nonlinear Equations • Introduce root-finding techniques such as: ○ Bisection Method ○ Newton-Raphson Method ○ Secant Method • Analyze the convergence and stability of these methods. 3. Interpolation and Approximation • Understand polynomial interpolation techniques such as:

- Lagrange Interpolation
- Newton's Divided Difference Method
- Discuss curve fitting and least squares approximation.

4. Numerical Differentiation and Integration

- Learn numerical differentiation techniques and their applications.
- Study numerical integration methods such as:
 - Trapezoidal Rule
 - Simpson's Rule
- Analyze error estimates in numerical differentiation and integration.

5. Solving Systems of Linear Equations

- Explore direct methods such as:
 - Gaussian Elimination
 - LU Decomposition
- Introduce iterative methods such as:
 - Jacobi Method
 - Gauss-Seidel Method

6. Solving Ordinary Differential Equations (ODEs)

- Learn numerical methods for solving ODEs, including:
 - Euler's Method
 - Runge-Kutta Methods
- Discuss stability and accuracy of ODE solvers.

By the end of the course, students should be able to understand, analyze, and implement numerical algorithms to solve mathematical and engineering problems efficiently.

9. Teaching and Learning Strategies

Strategy	Lectures on Blackboard and Data show. Tutorial solving problems in groups.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	<i>Understanding, Explaining, and discussing</i>	Introduction Errors of Numeric Results		
2-3	4	<i>Analyze</i>	Solution of Equations by Iteration Equations, $f(x) = 0$		

4-6	6	<i>Understanding and discussing</i>	Numeric Linear Algebra: solving systems of linear equations		
7	2	<i>Understanding and discussing</i>	Interpolation		
8-9	6	<i>Understanding and discussing</i>	Curve Fitting		
10-12	6	<i>understand, analyze, and implement numerical algorithms</i>	Numeric Integration and Differentiation		
13-15	6	<i>understand, analyze, and implement numerical algorithms</i>	Numeric for ODEs and PDEs		

11. course Evaluation

<u>Quizez</u>	<u>10</u>
<u>First exam</u>	<u>10</u>
<u>Second exam</u>	<u>20</u>
<u>Final exam</u>	<u>60</u>
<u>TOTAL</u>	<u>100%</u>

12. Learning and Teaching Resources

- ERWIN KREYSZIG," ADVANCED ENGINEERING MATHEMATICS " Tenth edition, 2011 JOHN WILEY & SONS, INC.
- NUMERICAL METHODS FOR ENGINEERS / STEVEN C. CHAPRA, COPYRIGHT © 2015 BY MCGRAW-HILL EDUCATION.

Course Description Form

1. Course Name:					
PUBLIC SAFETY					
2. Course Code:					
ENGE329					
3. Semester / Year:					
Autumn semester/2024-2025					
4. Description Preparation Date:					
1/10/2024					
5. Available Attendance Forms:					
Incide the class, online					
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: Hanan Haqi Ismail Thura Azzam Abed Email: hanan.eng2014@uomosul.edu.iq thura.azzam@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		- The course aims to teach the engineer the concept of public safety and its role in the system of human development and public life. - public safety and its relationship to public health and occupational safety. - the objectives of public safety, its laws and legislation. identify the results of work in public safety.			
9. Teaching and Learning Strategies					
Strategy		The strategy is achieved through lectures, e-learning platforms, and giving home and class works.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method

1	2	Learn about the concept of safety And its relationship to public and occupational health.	Introduction: It includes an overview of the concept of safety and its role in the system of human development and public life, the definition of public and occupational safety and its relationship to public and occupational health.	PowerPoint lecture	Daily exam
2	4	Learn about the most important legislation and laws Public safety in determining Responsibilities The employer, the workers and the relationship between them.	an overview of the OSHA organization in occupational safety and health management and its objectives And its legislations in defining the responsibilities of the employer and the workers and their definition of the work environment and the worker and the relationship between them.....,	PowerPoint lecture	Daily exam
2	4	Demonstrate the ability to lead and participate Productively in group situations. Know the duties of each supervisor Health and occupational doctor in addition Duties of each engineer The contractor and the official.	Definition of public administration and its five functions Public safety management. Determining the public safety committees and their tasks, the tasks of the public health and safety supervisor, the tasks of the work site doctor, the safety measures to be taken in the implementation of the project, the duties of the engineer, the contractor and the security .	PowerPoint lecture	Daily exam

2	4	Know the most important management functions in detail.	Management functions A detailed explanation of the function: planning, organizing, staffing, training, control, supervision, follow-up and their components.	PowerPoint lecture	Daily exam
2	4	Knowledge of the objectives and areas of compatibility engineering Culture and national safety strategy the public.	Human factors engineering adaptation 1. Its objectives and fields 2. The National Strategy for Public Safety and Occupational Health and Securing the Work Environment. 3. The culture of public safety and the factors of its success and failure and its impact on the behavior of the individual and society.	PowerPoint lecture	Daily exam
2	4	Know the appropriate work environment to achieve Occupational safety and health conditions.	proper working environment 1. The main factors affecting the work environment and its components 2. Responsibility for implementing the occupational safety and health program in the workplace 3. Responsibilities of the Employer and Workers Overview of work injuries	PowerPoint lecture	Daily exam
1	2	Know the most important means of personal protection To ensure that public safety conditions are met.	Personal protective equipment, its importance, advantages, shortcomings and types.	laboratory	Class work

1	2	Identify the most important signs Indicative and warning methods first aid .	General safety and first aid signs 1. Identify the shapes, colors, and illustrations of safety signs and their installation locations. 2. Definition of first aid, its importance, objectives, instructions, foundations for its success, and factors affecting it. 3. Influencing factors such as cleanliness, slipping, tripping and falling	discussion	Home work
1	2	Identify the types of risks that affect On human life and how to prevent Of which.	Risk Management1. Objectives and stages of risk management, types of risks, and ways to control and prevent these risks.2. What are the accidents and the consequences of these accidents?	PowerPoint lecture	Report
1	2	Knowledge of physical hazards Chemical hazards and damages and resulting injuries.	Physical hazards and chemical hazards 1. An introductory introduction to physical hazards, their causes, and damages and injuries resulting from them. 2. Safety methods in laboratories, workshops, mechanical equipment and factories. 3. An introduction to chemical hazards, their causes, damages and injuries resulting from them.	PowerPoint lecture And discussion	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

four quizzes, (each 2pt)	8
two H.W(each 1. pt.)	2
report	10
term Exam	20pt
Final Exam	60pt
Total	100pt

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Code of public safety in the implementation of construction projects (Iraqi construction code) issued by the Ministry of Construction, Housing, Municipalities and Public Works with the Ministry of Planning / first edition 2015 (a basic methodological book for safety material).
Main references (sources)	nothing
Recommended books and references (scientific journals, reports...)	Arab Safety Magazine
Electronic References, Websites	Arab Institute for Safety Sciences - Aiss http://aiss.co

Course Description Form

1. Course Name:					
Reinforced Concrete					
2. Course Code:					
ENV349					
3. Semester / Year:					
Spring semester / 2024-2025					
4. Description Preparation Date:					
20-09-2024					
5. Available Attendance Forms:					
face-to-face at classroom setting					
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: Rana Burhan Abdullrahman Email: rn.burha@uomosul.edu.iq					
8. Course Objectives					
Course Objectives			This course is an introduction to the analysis and design of reinforced concrete structural members. Topics covered will include working stress and ultimate strength methods for beams subjected to flexural bending and shear stresses, detailing of flexural and shear reinforcement in beams and short columns subjected to axial load and bending		
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					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3		Introduction to Reinforced Concrete		
2	6	The student shall be able to analyze and design of simple beams	Flexural Analysis of Beams (working stress method)		Quiz&H. W

		by working stress method		blend of online learning lectures with face-to-face instructions/ discussions of lectures.	
2	6		Flexural Analysis of Beams (Ultimate) According to ACI Code.		
2	6	The students shall be able to analyze and design of doubly reinforced beam by Ultimate strength design method .	Analysis and Design of Doubly Reinforced Beams		Quiz&H. W (1st term exam)
2	6	The students shall be able to analyze and design of T, L beams, by Ultimate strength design method	Analysis and Design of T, L Beams		Quiz&H. W
2	6	The students shall be able to design the shear reinforcement of beams	Shear Stresses in Concrete Beams; Design for Shear.		Quiz&H. W (2nd term exam)
4	12	The students shall be able to analyze and design for short columns at axial compression load	Columns Design of Short Columns Subject to Axial Load and Bending		Quiz&H. W

11. Course Evaluation					
5 Home work: 5 pts 5 Quizzes: 5 pts 1st Term exam: 15 pts 2nd Term exam: 15 pts Final exam: 60 pts					
12. 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) "DESIGN OF REINFORCED CONCRETE"8th ed. Library of Congress, USA.		
Electronic References, Websites			https://www.youtube.com/watch?v=lyg_a8NVEzY		
Update rate of the course			1%		

Course Instructor

Rana Burhan Abdulrahman

Department Chair

Abdullah Ismail Ibrahim

Course Description Form

1. Course Name: Sanitary sewers networks					
2. Course Code: ENV346					
3. Semester / Year: Autumn (2024-2025)					
4. Description Preparation Date: 10/10/2024					
5. Available Attendance Forms: Class room					
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. Layth Abdulaleem Mahmood Email: 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-Applying 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.				
9. Teaching and Learning Strategies					
Strategy	The course will be covered by class room lectures; four hours each week explaining the materials with giving examples, and one hour for tutorials problems.				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
2	6	G01	Sewers networks: Components of sanitary sewage, Sewers networks types; Sewers design activities.	In class	Quizzes, Semester exam, Final exam,
3	9	G02	Sanitary sewers network design.		
2	6	G01	Minor and major drainage Systems of storm water,		

2	9	G02	Estimating storm runoff; Rational method.		
2	6	G01	Storm sewers design. Sewer Appurtenances: Manholes; Inverted siphon; outlets and outfalls; inlets, Alternative sewer systems; Sewage lift stations.		
4	12	G02	Plumbing: Water supply network design; Sanitary drainage network design, storm network design.		

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

8 Quizzes 20 score
1 Semester exam 20 score
1 Final exam 60 score
Total score 100 score

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: Soil Mechanics	
2. Course Code: ENV342	
3. Semester / Year: 2024-2025	
4. Description Preparation Date: September 2024	
5. Available Attendance Forms: attending	
6. Number of Credit Hours (Total) / Number of Units (Total)	
90 / 4	
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 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	CLO-1	Introduction	E-learning and in-person education	Exams and homework
2	3	CLO-1	Physical-mechanical properties of soil	E-learning and in-person education	Exams and homework
3	3	CLO-3	Physical-mechanical properties of soil	E-learning and in-person education	Exams and homework
4	3	CLO-4	Soil classification	E-learning and in-person education	Exams and homework
5	3	CLO-1	Soil classification	E-learning and in-person education	Exams and homework
6	3	CLO-3	Hydraulic properties of soil	E-learning and in-person education	Exams and homework
7	3	CLO-1	Hydraulic properties of soil	E-learning and in-person education	Exams and homework
8	3	CLO-1	Hydraulic properties of soil	E-learning and in-person education	Exams and homework
9	3	CLO-6	Soil improvement	E-learning and in-person education	Exams and homework
10	3	CLO-1	Stresses in soil	E-learning and in-person education	Exams and homework
11	3	CLO-1+ CLO-5	Stresses in soil	E-learning and in-person education	Exams and homework
12	3	CLO-1+ CLO-5	Settlement in soil	E-learning and in-person education	Exams and homework
13	3	CLO-3	Settlement in soil	E-learning and in-person education	Exams and homework
14	3	CLO-3	Shear stress in soil	E-learning and in-person education	Exams and homework
15	3	CLO-2	Soil investigation	E-learning and in-person education	Exams and homework

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	CLO-3+CLO-4	Introduction Index properties	in-person education	Practical report and exam
2	3	CLO-3+CLO-4	Specific gravity	in-person education	Practical report and exam
3	3	CLO-3+CLO-4	Atterbuge limits	in-person education	Practical report and exam
4	3	CLO-3+CLO-4	Soil classification	in-person education	Practical report and exam
5	3	CLO-3+CLO-4	Hydrometer test	in-person education	Practical report and exam
6	3	CLO-3+CLO-4	Permeability test	in-person education	Practical report and exam
7	3	CLO-3+CLO-4	Compaction test	in-person education	Practical report and exam
8	3	CLO-3+CLO-4	Filed density test Sand cone test	in-person education	Practical report and exam
9	3	CLO-3+CLO-4	Filed density test core cutter test	in-person education	Practical report and exam
10	3	CLO-3+CLO-4	Consolidation test	in-person education	Practical report and exam
11	3	CLO-3+CLO-4	Swelling test	in-person education	Practical report and exam
12	3	CLO3+CLO-4	Shear test	in-person education	Practical report and exam
13	3	CLO-3+CLO-4	unconfined compressive strength	in-person education	Practical report and exam
14	3	CLO-3+CLO-4	Soil chemical test	in-person education	Practical report and exam
15	3	CLO-3+CLO-4	General review of devices	in-person education	Practical report and exam
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 الشكري, هندسة الأساس (2002)
Electronic References, Websites	Various websites concerned with the topic

Course Description Form

1. Course Name:					
Solid Waste					
2. Course Code:					
ENV350					
3. Semester / Year:					
(Spring semester) / 2024-2025					
4. Description Preparation Date:					
15/9/2024					
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. Anas Fakhry Qassid Email: anasfq@uomosul.edu.iq					
8. Course Objectives					
Course Objectives		- Explain municipal solid waste management systems with respect to its physical properties, and associated critical considerations. - Outline sources, types and composition of solid waste with methods of handling, sampling and storage of solid waste - Design the collection systems of solid waste of a town - Design treatment of municipal solid waste and landfill - Design a composting facility			
9. Teaching and Learning Strategies					
Strategy		This course has several components that include lectures, assignments, exercises, and design projects. Students will 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 deadline to be admitted to the exams.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	G.O.1	Objectives, Evolution of Solid-Waste Management	In Class	Quizzes Homework Semester Exam Project Final Exam
2	4	G.O.1	Legislative Trends and Impacts		
3	4	G.O.1	Sources, Types, and Composition of Municipal Solid Wastes		
4	4	G.O.1	Application examples about composition of solid waste		

5	4	G.O.1	Physical Properties of Municipal Solid Waste		
6	4	G.O.1	Chemical Properties of Municipal Solid Waste		
7	4	G.O.1	Biological Properties of Municipal Solid Waste		
8	4	G.O.1	Sources, Types, and Properties of Hazardous Wastes Found in Municipal Solid Waste		
9	4	G.O.1	Solid Waste Generation and Collection Rate		
10	4	G.O.1	Waste Handling and Separation, Storage, and Processing at the Source		
11	4	G.O.2	Collection of Solid Waste		
12	4	G.O.2	Mid-Term Exam		
13	4	G.O.2	Transfer and Transport		
14	4	G.O.2	Separation and Processing and Transformation of Solid Waste		
15	4	G.O.2	Disposal of Solid Wastes and Residual Matter		

11. Course Evaluation

4 quizzes	8pt	
4 homework	4pt	
Term Exam	20pt	
Report	8pt	
Final Exam	60pt	
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:					
Water Chemistry					
2. Course Code:					
ENV 348					
3. Semester / Year:					
Spring/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)					
3/3					
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. Understanding with the equilibrium reactions in close and open systems, the interaction between different phases (liquid, gas and solid), and the reduction-oxidation reactions in environmental systems. 2. Learning to predict the chemical composition, pH and redox condition of an aquatic system. 3. Developing the tools to solve problems with complex chemical reactions in natural and engineer systems		
9. Teaching and Learning Strategies					
Strategy		The course will focus on in-class learning with 3 hours p week. The ability of student will be measured by quizz report, midterm and final exams.			
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	1	1. Define water chemistry and recognize its	In-Class	Paper Base Teat

			importance in environmental systems 2. Describe water and its main properties. 3. Calculate concentration in different media/systems		
2	6	1	1. Balance chemical reactions 2. Quantify reaction rates 3. Define chemical equilibrium	In-Class	Paper Base Test
2	6	2	1. Distinguish between an acid and a base 2. Define water dissociation 3. Know acidity and basicity constant 4. Define and calculate pH	In-Class	Paper Base Test
2	6	2	1. Solve numerical problems to calculate the pH of a solution 2. Estimate the speciation of a solution for a known pH 3. Draw log C-pH diagrams	In-Class	Paper Base Test
2	6	1	1. Solve problems using log C-pH diagrams 2. Identification of the predominant species in a solution 3. Solving problems using Proton Condition approach	In-Class	Paper Base Test
2	6	1	1. Titration in buffer systems 2. Define alkalinity and understanding the importance in environmental systems	In-Class	Paper Base Test

			3. Solve problems for the carbonate system		
			Midterm	In-Class	Paper Base Test
1	3	1	1. Working with gas-phase concentration in an ideal gas 2. Using Henry's constant to predict partition between liquid-gas systems	In-Class	Paper Base Test
1	3	1	1. Define what a metal is 2. Identify the role of metals in acid-base chemistry 3. Describe metals behavior in water 4. Distinguish between the different dissociation constant for metal systems 5. Calculating metal speciation in water and with other ligands	In-Class	Paper Base Test
2	6	1	1. Define the Laws of Thermodynamics and their relation with water chemistry 2. Calculate the energy in chemical reactions – Gibbs Energy 3. Define equilibrium based on energy state of a reaction 4. Calculate the equilibrium constant of a chemical reaction	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)	Water Chemistry, 1st Edition, Mark Benjamin, Waveland Press, Inc., 2010.
Main references (sources)	Lectures
Recommended books and references (scientific journals, reports...)	Lectures
Electronic References, Websites	NA

Course Description Form

1. Course Name: Water supply networks					
2. Course Code: ENV340					
3. Semester / Year: Autumn (2024-2025)					
4. Description Preparation Date: 10/10/2024					
5. Available Attendance Forms: Class room					
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. Layth Abdulaleem Mahmood Email: 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, and 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 the analysis of network using EPAnet 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 for tutorials problems. Explanation on necessary computer software will be given and a project on an actual network will be submitted by one student or group.				
10. Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
2	6	G01	Hazen Williams equation and its applications, equivalent pipe.	Classroom Lectures	Quizzes, Semester exam, Final exam, And project
2	6	G01	Water distribution network, Demand allocation, skeletonization Distribution methods, types of distribution networks.		
3	9	G02	Design and analysis of		

2	6	G01, G02	networks, design considerations, Hardy Cross method, Fire hydrants. Types of service storage tanks, computation of volume of each part of tank, location of service tank, tank maintenance.		
3	9	G01, G02	Pump stations, system head curve, Pump curves, pump selection, pumps in series and in parallel, cavitation phenomenon, types of pumps.		
1	3	G01	Types of materials, types of valves.		
2	6	G01, G02	Loads on buried pipes, pipe bedding, thrust forces.		

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

8 Quizzes 20 score
1 Semester exam 20 score
1 Final exam 60 score
Total score 100 score

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	

المقررات الدراسية / كلية الهندسة / جامعة الموصل

المستوى الرابع للعام الدراسي 2022-2023

قسم هندسة البيئة

المستوى الدراسي الرابع (الفصل الخريفي)									
اسم المتطلب	نوع المتطلب (اجباري – اختياري)	اسم المقرر		عدد الساعات النظرية	عدد الساعات العملية	عدد الوحدات	الممهد ان وجد	رمز المقرر	الملاحظات
		باللغة العربية	باللغة الإنكليزية						
متطلبات كلية	اجباري	ادارة هندسية	Engineering management	2		2		ENG 425	
	اختياري	هندسة البيئة المستدامة	Environmental engineering and Sustainable	2		2		ENG436	
متطلبات القسم	اجباري	معالجة مياه الشرب	Drinking water treatment	4		4	هندسة نوعية المياه، شبكات اسالة ، تطبيقات هيدروليک	ENV440	
	اجباري	تصاميم محطات معالجة مياه الفضلات	Wastewater treatment design	4		4	هندسة نوعية المياه، شبكات الصرف الصحي، تطبيقات هيدروليک	ENV441	
	اجباري	تصاميم انشائية بيئية	Environmental construction design	3		3	خرسانة مسلحة، هندسة الاسس	ENV442	
	اجباري	السيطرة على تلوث الهواء	Air pollution control	3		3	تلوث الهواء	ENV443	
	اجباري	مشروع هندسي_1	Engineering Project_1	2		2		ENV444	
	مجموع ساعات ووحدات الفصل الدراسي الأول								
				20	0	20			

المستوى الدراسي الرابع (الفصل الربيعي)

اسم المتطلب	نوع المتطلب (اجباري – اختياري)	اسم المقرر		عدد الساعات النظرية	عدد الساعات العملية	عدد الوحدات	الممهد ان وجد	رمز المقرر	الملاحظات
		باللغة العربية	باللغة الإنكليزية						
متطلبات الجامعة	اجباري	اللغة الإنكليزية - متقدم	English language-advance	2		2		UOM	
متطلبات الكلية	اجباري	اقتصاد هندسي	Engineering economic	2		2	ادارة هندسية	ENG426	
متطلبات القسم	اجباري	معالجة فضلات صناعية وخطرة	Industrial and hazardous wastewater	4		4	تصاميم محطات معالجة مياه الفضلات	ENV445	
	اجباري	تلوث التربة والمياه الجوفية	Soil and ground water pollution	3		3	هندسة نوعية المياه، علم المياه	ENV446	
	اجباري	رسم انشائي	Construction drawing	2		2	رسم هندسي، خرسانة مسلحة	ENV447	
	اجباري	تخمين	Estimation	2		2		ENV448	
	اجباري	مشروع هندسي_2	Engineering Project_2	2		2		ENV449	
	اختياري	معالجة مياه شرب متقدمة	Advance water supply	2		2	معالجة مياه شرب	ENV490	يختار الطالب احدى هاتين المادتين
	اختياري	معالجة مياه فضلات متقدمة	Advance wastewater treatment	2		2	تصاميم محطات معالجة مياه الفضلات	ENV491	
		مجموع ساعات ووحدات الفصل الدراسي الأول					19	0	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 Test
2	4	1	In-plant survey; Identifying wastewater generating operations; Preparing mass balance calculations for industrial operations	In-Class	Paper B Test
3	4	2	In-plant survey; Identifying wastewater generating operations; Preparing mass balance calculations for industrial operations	In-Class	Paper B Test
4	4	2	In-plant control; Volume and strength reduction	In-Class	Paper B Test
5	4		Life Cycle Assessment (LCA)	In-Class	Paper B Test
6	4	1	Industrial wastewater treatment technologies: Neutralization	In-Class	Paper B Test
7	4	1	Industrial wastewater treatment technologies: equalization	In-Class	Paper B Test

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	