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

Academic Program and Course Description Guide

2026

Introduction:

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

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

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (Bologna, 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, 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: Dams and Water Resources Engineering
Academic or Professional Program Name: Dams and Water Resources Engineering
Final Certificate Name: BSc. of science in Dams and Water Resources Engineering
Academic System: Course System + Bologna Process
Description Preparation Date: September, 2025
File Completion Date: September, 2025

Signature :
Head of Department Name :
Dr. Omar Muqdad Abdulgany
Date : 7-4-2026

Signature :
Scientific Associate Name :
Dr. Ayman T Hameed.
Date :

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance
Department :
Date :
Signature :

جامعة الموصل
مكتب العميد
كلية الهندسة

Approval of the Dean

1. Program Vision

The vision of Dams and Water Resources Department (DWR) is to be a pioneer and leader in water development studies in Iraq and plays essential role in controlling these studies and investing them in the field of irrigation and electrical generation, storage and distribution of water in dam reservoirs and water resources engineering. DWR aims to achieve an advanced level of education in the field of dam engineering, water resources that meet the country's need for engineering alumni to secure the completion of future plans in the fields of work in which the department's specialization is part of it.

2. Program Mission

1- Qualify competent engineers to work in the field of water resources.

2- Prepare alumni with distinct capabilities to meet the current and future challenges related to the optimal use of water resources and face the drought phenomenon.

3- Provide the country and society with specialists who hold higher degrees in the hydraulic, hydrological and irrigation specialties to benefit from their scientific expertise.

4- Develop students 'performance and strategies to deal with real world problems through constructive and advanced scientific thinking.

5- Adopt the distinguished and creative ideas of students and encouraging them to work as a team.

6- Maintain communication with department's alumni through inviting them to seminars, scientific conferences, and continuing education programs.

3. Program Objectives

The Program Educational Objectives of Dams and Water Resources Department may be listed as:

1- Prepare engineers with solid scientific and practical foundations in water resources engineering, capable of designing and managing hydraulic and irrigation systems using modern tools, while adhering to professional ethics and serving the public interest.

2- Equip professionals capable of analyzing and solving real-world water-related challenges, communicating effectively, and contributing responsibly to societal needs and national development through sustainable and ethical engineering practices.

3- Promote a culture of lifelong learning, research, and self-development, enabling graduates to pursue postgraduate studies and collaborate with academic, industrial, and international institutions in service of the community and the environment.

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	12	19	13	
College Requirements	12	24	16	
Department Requirements	56	105	71	
Summer Training	1	….		
Other				

7. Program Description

First Level

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
DWRE 111	Mathematics I	93	82	7.00	B	
DWRE 112	Engineering Mechanics I	78	72	6.00	B	
DWRE 113	Engineering Drawing	93	57	6.00	B	
UOM 1011	Arabic 1	33	17	2.00	S	
DWRE 114	Introduction to Water Resources Engineering	48	27	3.00	C	
UOM 1031	Computer 1	48	27	3.00	S	
DWRE 117	Geology	48	27	3.00	S	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
DWRE 121	Mathematics II	93	82	**7.00**	B	
DWRE 122	Engineering Mechanics II	78	72	**6.00**	B	
DWRE 123	Computer Drawing	93	57	**6.00**	B	
DWRE 124	Statistics	48	52	**4.00**	B	
DWRE 125	Chemistry	48	27	**3.00**	S	
UOM 1040	Human Rights and Democracy	33	17	**2.00**	B	
UOM 1021	English 1	33	17	**2.00**	S	

Second Level

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
DWRE 211	Mathematics III	63	62	**5.00**	B	
DWRE 212	Fluid Mechanics I	93	57	**6.00**	C	
DWRE 213	Strength of Materials	78	72	**6.00**	B	
DWRE 214	Surveying	78	22	**4.00**	C	
UOM 2032	Computer II	48	27	**3.00**	B	
DWRE 216	Building Construction	63	37	**4.00**	C	
UOM 2012	Arabic 2	33	17	**2.00**	B	

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
DWRE 221	Differential Equations	63	62	**5.00**	B	
DWRE 222	Fluid Mechanics II	78	47	**5.00**	C	DWRE 212
DWRE 223	Structures	78	72	**6.00**	B	
DWRE 224	Areas and Volumes	78	22	**4.00**	C	
DWRE 225	Physics and Soil Science	93	57	**6.00**	C	
UOM 2022	English 2	33	17	**2.00**	B	
UOM 2050	Baath Crimes in Iraq	33	17	**2.00**	B	

Third Level

Semester 5 | **30 ECTS** | **1 ECTS = 25 hrs**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
DWRE 311	Hydraulics	78	47	**5.00**	C	
DWRE 312	Surface Water Hydrology	78	47	**5.00**	C	
DWRE 313	Irrigation Principles and Practices	63	37	**4.00**	C	
DWRE 314	Concrete Design	93	82	**7.00**	S	
DWRE 315	Principles of Soil Mechanics	108	67	**7.00**	C	
DWRE 316	Statistical Methods in Hydrology	33	17	**2.00**	S	

Semester 6 | **30 ECTS** | **1 ECTS = 25 hrs**

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
DWRE 321	Numerical Analysis	78	72	**6.00**	C	
DWRE 322	Open Channels	78	47	**5.00**	C	DWRE 311
DWRE 323	Groundwater Hydrology	78	22	**4.00**	C	
DWRE 324	Drainage Engineering	78	72	**6.00**	C	
DWRE 325	Soil Mechanics and Foundations	93	32	**5.00**	C	
DWRE 326	Consumptive Use and Water Duty	33	17	**2.00**	C	
DWRE 327	Engineering Project Design & Planning	33	17	**2.00**	S	

Fourth Level

18 UNITS

Code	Module	Theoretical	Practical	Applied	Units
DWRE401	Design of Hydraulic Structures I	2	2	1	3
DWRE402	Design of Gravity Irrigation Systems	2	2	1	3
DWRE403	Design of irrigation and drainage networks I	1	2	-	2
DWRE404	Estimation and engineering Specifications I	1	2	-	2
DWRE405	Economic Sciences	2	-	2	2
DWRE406	Dams Engineering I	2	-	2	2
DWRE407	Foundation Engineering I	2	-	-	2
DWRE408	Engineering Project I	-	4	-	2

18 UNITS

Code	Module	Theoretical	Practical	Applied	Units
DWRE409	Design of Hydraulic Structures II	1	2	1	2
DWRE410	Design of Sprinkler and Drip Irrigation Systems	1	2	1	2
DWRE411	Design of irrigation and drainage networks II	1	2	–	2
DWRE412	Estimation and engineering specifications II	1	2	–	2
DWRE413	Engineering Management	2	–	2	2
DWRE414	Dams Engineering 2	2	–	2	2
DWRE415	Foundation Engineering II	2	–	–	2
DWRE416	Engineering Project II	–	4	–	2
DWRE417	Applied Sciences	2	-	-	2

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes (**A**)	i. An ability to distinguish identify, define, formulate, and solve engineering problems by applying principles of engineering, science and mathematics. (i) ii. An ability to produce engineering designs that meet desired needs within certain constraints by applying both analysis and synthesis in the design process. (ii) iii. An ability to perceive the continual necessity for professional knowledge growth and how to find, assess, assemble and apply it properly. (vi)
Skills	
Learning Outcomes (**B**)	i. An ability to create and carry out proper measurement and tests with quality assurance, analyze and interpret results, and utilize engineering judgment to make inferences. (iii) ii. An ability to skillfully communicate orally with a gathering of people and in writing with various managerial levels. (iv) iii. An ability to work adequately on teams and to set up objectives, plan activities, meet due dates, and manage risk and uncertainty. (vii)
Ethics	
Learning Outcomes (**C**)	i. An ability to perceive ethical and professional responsibilities in engineering cases and make brilliant judgments taking into account the consequences in worldwide financial, ecological and societal considerations. (v) ii. An ability to work adequately on teams and to set up objectives, plan activities, meet due dates, and manage risk and uncertainty. (vii)

9. Teaching and Learning Strategies

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

10. Evaluation methods

- Mid-Term and Final exams
- Quizzes
- Technical Reports and Projects
- Laboratory Reports and Exams

11. Faculty

Faculty Members

Academic Rank	Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
	General	Special			Staff	Lecturer
Professor	Water Resources Engineering	Hydraulic			1	

Assist. Professor	Water Resources Engineering	Irrigation and Drainage			2	
Assist. Professor	Water Resources Engineering	Hydraulic			2	
Assist. Professor	Water Resources Engineering	Hydrology			3	
Lecturer	Dams and Water Resources Engineering	Irrigation and Drainage			2	
Lecturer	Water Resources Engineering	Hydraulic			3	
Lecturer	Water Resources Engineering	Hydrology			4	
Lecturer	Agriculture	Soil Physics			1	
Assist. Lecturer	Dams and Water Resources Engineering	Hydraulic			3	
Assist. Lecturer	Dams and Water Resources Engineering	Hydrology			2	
Assist. Lecturer	Dams and Water Resources Engineering	Irrigation and Drainage			1	

Professional Development

Mentoring new faculty members

The academic program is designed to comprehensively enhance the knowledge and skills of new faculty members across various educational fields. It begins by focusing on equipping faculty with the fundamental ability to effectively manage their courses. It then progresses to encompass the processes and procedures necessary to ensure the successful achievement of targeted learning outcomes in diverse programs.

To achieve these goals, the program includes the following key components:

1. **Educational Courses**: New faculty members participate in educational courses aimed at improving the quality of the educational learning process. These courses cover a range of topics, including:
    - **Training on Teaching Methods**: Instruction on effective strategies for engaging students and delivering course content.
    - **Designing Course Outlines**: Guidance on structuring and organizing course materials to optimize student learning.
    - **Modern Trends in University Teaching**: Exploration of innovative approaches to teaching and learning in higher education.
    - **Evaluating Student Learning**: Techniques for assessing student performance and understanding.
    - **Preparing Tests**: Strategies for creating fair and rigorous assessments.
    - **University Policies**: Familiarization with relevant laws, regulations, instructions, and e-learning platforms.
2. **Continuous Evaluation**: Faculty members, both full-time and part-time, undergo continuous evaluation to identify areas for development throughout their educational careers. This process helps ensure that faculty are continually improving and adapting to meet the evolving needs of students and the university.
3. **Professional Development Opportunities**: Faculty members are encouraged to participate in teaching staff development courses offered by the department or the university's continuing education unit. These courses provide opportunities for faculty to enhance their skills, stay current with trends in education, and collaborate with colleagues.

Professional development of faculty members

Continuous Learning Committee of Dams and Water Resources 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/ 9
- ✓ Scientific publications/44
- ✓ Academic accreditation/2
- ✓ Miscellaneous seminars in the water resources 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 three academic years, 15 faculty members presented a total skills development (34 workshops/16 continuous education courses). The department encourages faculty members to attend conferences, seminars, workshops, and training courses for professional development.

12. Acceptance Criterion

To be eligible for admission to the Dams and Water Resources Department at the undergraduate level, applicants must meet certain requirements. The admissions process is overseen by the Ministry of Higher Education and Scientific Research, which electronically manages and allocates student admissions to government institutions and faculties based on their secondary school grades. Here are some of the key requirements for student acceptance:

A- Iraqi Nationality and Year of Birth: Applicants must hold Iraqi nationality and be born in 2008 or later.

B- Iraqi Secondary School Certificate: Applicants need to possess a certificate issued by an Iraqi secondary school that is authorized by the Ministry of Education.

C- Medical Certificate: Applicants must provide a medical certificate to demonstrate that they meet the necessary health requirements.

D- Full-Time Student: Applicants should commit to being full-time students, dedicating their time and efforts to their studies in the department.

E- Not acceptable and continues to study in another college.

F- Non-Iraqi students (arrivals) who obtained a certificate of an Iraqi secondary school admitted according to the central acceptance.

G- Admission 10% of the top graduates of technical institutes.

H- Acceptance of talented students.

13. The most important sources of information about the program

- Guidebook for Mosul University The departmental website: https://uomosul.edu.iq/en/engineering/dams-water-resources-engineering-dept/

14. Program Development Plan

To enhance the quality of education, elevate graduate outcomes, and meet the competencies required by increasingly complex societies, the department council has decided to adopt the "Bologna process system of Education." This system incorporates the European Credit Transfer and Accumulation System (ECTS) instead of the traditional course-based system, aligning with the department's commitment to continuous improvement. The new system implemented starting in the academic year 2023-2024.

The adoption of the Bologna process is expected to yield several benefits:

- **Student-Centered Learning**: The system places students at the core of the learning process, enhancing the overall education system.
- **Increased Class Interaction**: The constant engagement between teachers and students promotes a more dynamic learning environment.
- **Focus on Professional and Practical Skills**: Emphasis is placed on acquiring practical skills relevant to professional development.
- **Opportunity for Continuous Learning**: Students have the opportunity for ongoing learning, assessment, and feedback.

- **Biannual Performance Evaluation**: The system allows for the evaluation of student performance twice a year, providing more comprehensive feedback.
- **Enhanced Subject Understanding**: The system is expected to facilitate a deeper understanding of subjects among students.

Program Skills Outline												
				Required program Learning outcomes								
Year/Level	Course Code	Course Name	Basic or optional	Knowledge			Skills			Ethics		
				i	ii	vi	iii	iv	vii	v	vii	
1	DWRE 111	Mathematics I	Basic	*	*							
	DWRE 112	Engineering Mechanics I	Basic	*	*				*			
	DWRE 113	Engineering Drawing	Basic	*	*							
	UOM 1011	Arabic 1	Basic					*				
	DWRE 115	Introduction to Water Resources Engineering	Basic	*			*					
	UOM 1031	Computer 1	Basic	*	*			*				
	DWRE 117	Geology	Basic	*			*					
	DWRE 121	Mathematics II	Basic	*	*							
	DWRE 122	Engineering Mechanics II	Basic	*	*							
	DWRE 123	Computer Drawing	Basic	*	*			*				
	DWRE 124	Statistics	Basic	*	*							
	DWRE 125	Chemistry	Basic	*			*					
	UOM 1040	Human Rights and Democracy	Basic							*		
	UOM 1021	English 1	Basic					*				

Program Skills Outline												
First Semester				Required program Learning outcomes								
Year/Level	Course Code	Course Name	Basic or optional	Knowledge			Skills			Ethics		
				i	ii	vi	iii	iv	vii	v	vii	
2	DWRE 211	Mathematics III	Basic	*	*							
	DWRE 212	Fluid Mechanics I	Basic	*	*							
	DWRE 213	Strength of Materials	Basic	*	*			*				
	DWRE 214	Surveying	Basic	*	*				*			
	UOM 2032	Computer II	Basic	*	*			*				
	DWRE 216	Building Construction	Basic	*	*							
	UOM 2012	Arabic 2	Basic	*	*			*				
	DWRE 221	Differential Equations	Basic	*	*							
	DWRE 222	Fluid Mechanics II	Basic	*	*							
	DWRE 223	Structures	Basic	*	*			*				
	DWRE 224	Areas and Volumes	Basic	*			*					
	DWRE 225	Physics and Soil Science	Basic	*			*			*		

	UOM 2022	English 2	Basic					*			
	UOM 2050	Baath Crimes in Iraq	Basic	*	*						

Program Skills Outline												
Second Semester				Required program Learning outcomes								
Year/Level	Course Code	Course Name	Basic or optional	Knowledge			Skills			Ethics		
				i	ii	vi	iii	iv	vii	v	vii	
3	DWRE 311	Hydraulics	Basic	*	*			*				
	DWRE 312	Surface Water Hydrology	Basic	*	*					*		
	DWRE 313	Irrigation Principles and Practices	Basic	*	*				*			
	DWRE 314	Concrete Design	Basic	*	*							
	DWRE 315	Principles of Soil Mechanics	Basic	*	*							
	DWRE 316	Statistical Methods in Hydrology	Basic	*	*							

Program Skills Outline												
				Required program Learning outcomes								
Year/Level	Course Code	Course Name	Basic or optional	Knowledge			Skills			Ethics		
				i	ii	vi	iii	iv	vii	v	vii	
3	DWRE 321	Numerical Analysis	Basic	*	*		*					
	DWRE 322	Open Channels	Basic	*	*	*	*					
	DWRE 323	Groundwater Hydrology	Basic	*	*							
	DWRE 324	Drainage Engineering	Basic	*	*			*	*		*	
	DWRE 325	Soil Mechanics and Foundations	Basic	*	*				*		*	
	DWRE 326	Consumptive Use and Water Duty	Basic	*			*					
	DWRE 327	Engineering Project Design & Planning	Basic	*	*		*	*		*	*	

Program Skills Outline												
				Required program Learning outcomes								
Year/ Level	Course Code	Course Name	Basic or optional	Knowledge			Skills			Ethics		
				i	ii	vi	iii	iv	vii	v	vii	
4	DWRE401	Design of Hydraulic Structures I	Basic	*	*					*		
	DWRE402	Design of Gravity Irrigation Systems	Basic	*	*		*					
	DWRE403	Design of irrigation and drainage networks I	Basic	*	*			*				
	DWRE404	Estimation and engineering Specifications I	Basic	*	*							
	DWRE405	Economic Sciences	Basic	*	*			*				
	DWRE406	Dams Engineering I	Basic	*	*							
	DWRE407	Foundation Engineering I	Basic	*	*							
	DWRE408	Engineering Project I	Basic	*	*		*	*	*	*	*	

Program Skills Outline												
				Required program Learning outcomes								
Year/ Level	Course Code	Course Name	Basic or optional	Knowledge			Skills			Ethics		
				i	ii	vi	iii	iv	vii	v	vii	
4	DWRE409	Design of Hydraulic Structures II	Basic	*	*		*					
	DWRE410	Design of Sprinkler and Drip Irrigation Systems	Basic	*	*		*		*		*	
	DWRE411	Design of irrigation and drainage networks II	Basic	*	*	*						
	DWRE412	Estimation and engineering specifications II	Basic	*	*							
	DWRE413	Engineering Management	Basic	*	*		*					
	DWRE414	Dams Engineering 2	Basic	*	*							
	DWRE415	Foundation Engineering II	Basic	*	*							
	DWRE416	Engineering Project II	Basic	*	*		*	*	*	*	*	
	DWRE417	Applied Sciences	Basic	*	*							

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	1	1	DWRE 111	Mathematics I	الرياضيات ا	English	3	1			2		3	93	82	175	7.00	B	
		2	DWRE 112	Engineering Mechanics I	الميكانيك الهندسي ا	English	2	1			2		3	78	72	150	6.00	B	
		3	DWRE 113	Engineering Drawing	الرسم الهندسي	English			6				3	93	57	150	6.00	B	
		4	UOM 1011	Arabic 1	اللغة العربية 1	Arabic	2						3	33	17	50	2.00	S	
		5	DWRE 114	Introduction to Water Resources Engineering	مقدمة في هندسة الموارد المائية	Arabic	2	1					3	48	27	75	3.00	C	
		6	UOM 1031	Computer 1	حاسوب 1	English	1		2				3	48	27	75	3.00	S	
		7	DWRE 117	Geology	جيولوجي	Arabic	2	1					3	48	27	75	3.00	S	
					Total Weekly Hours	28	12	4	8	0	4	0	21	441	309	750	30.00		

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	2	1	DWRE 121	Mathematics II	الرياضيات II	English	3	1			2		3	93	82	175	7.00	B	
		2	DWRE 122	Engineering Mechanics II	الميكانيك الهندسي II	English	2	1			2		3	78	72	150	6.00	B	
		3	DWRE 123	Computer Drawing	الرسم بواسطة الحاسوب	English			6				3	93	57	150	6.00	B	
		4	DWRE 124	Statistics	الإحصاء	English	1				2		3	48	52	100	4.00	B	
		5	DWRE 125	Chemistry	كيمياء	Arabic	1		2				3	48	27	75	3.00	S	
		6	UOM 1040	Human Rights and Democracy	الديمقراطية وحقوق الانسان	Arabic	2						3	33	17	50	2.00	B	
		7	UOM 1021	English 1	اللغة الإنكليزية 1	English	2						3	33	17	50	2.00	S	
					Total Weekly Hours	27	11	2	8	0	6	0	21	426	324	750	30.00		

Course Description Form

1. Course Name:
Mathematics I
2. Course Code:
DWRE 111
3. Semester / Year:
First/ 2025−2026
4. Description Preparation Date:
1/6/2025
5. Available Attendance Forms:
Lectures in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
93 hours/ 7 ECTS credits
7. Course administrator's name (mention all, if more than one name)
Name:Dr. Ahmed Ali Mohammed Ameen, Email: a.alogaidi@uomosul.edu.iq
8. Course Objectives

Course Objectives	Knowledge of the Matrices and determinants, An Overview of the derivatives, Integration, Indefi integral, Integration by substitution, The definite integral, Evaluating definite integrals by substitut Applications of the definite integral, Area between two curves, Volumes by slicing; disks and wash Volumes by cylindrical shells, Length of a plane curve and Area of a surface of revolution.

9. Teaching and Learning Strategies	
Strategy	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 some challenging problems to motivate students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	6	The student learned how to solve matrices and determinants in several ways	Matrices and determinants	A lecture in the classroom	HW and CW
2	6	The student learned how to derive equations and find the slope	An Overview of the derivatives	A lecture in the classroom	HW, CW, exam
3	6	The student learns how to solve integrals	Integration	A lecture in the classroom	HW, CW, exam
4	6	The student learned to solve indefinite integrals	Indefinite integral	A lecture in the classroom	HW, CW, exam
5	6	The student learned to solve another type of integrals	Integration by substitution,	A lecture in the classroom	HW, CW, exam

6	6	The student learned how to solve an important type of definite integral	The definite integral	A lecture in the classroom	HW, CW, exam
7	6	The student learned how to solve a type of definite integral using substitution	Evaluating definite integrals by substitution	A lecture in the classroom	HW, CW, exam
8-9	12	The student learns how to apply definite integrals	Applications of the definite integral	A lecture in the classroom	HW, CW, exam
10	6	The student learned how to find the areas of specific shapes by applying integrals	Area between two curves	A lecture in the classroom	HW, CW, exam
11-12	12	The student learned how to find the volumes of specific shapes by applying integrals	Volumes by slicing; disks wash	A lecture in the classroom	HW, CW, exam
13	6	The student learned how to find the volumes of specific shapes by applying integrals	Volumes by cylindrical shel	A lecture in the classroom	HW, CW, exam
14	6	The student learned how to find the specified lengths by applying integrals	Length of a plane curve	A lecture in the classroom	HW, CW, exam
15	6	The student learned how to find the surface areas of rotation by applying integrals	Area of a surface of revolut	A lecture in the classroom	HW, CW, exam

11. Course Evaluation

Evaluation type	**Degree**
4 quizzes	15
14 homework	15
10 classwork	10
Term exam	10
Final exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Calculus I By: Thomas
Main references (sources)	Calculus I By: Thomas 2018
Recommended books and references (scientific journals, reports…)	-------
Electronic References, Websites	-------

Course Description Form

1. Course Name:
Engineering mechanics I
2. Course Code:
DWRE 111
3. Semester / Year:
1/ 2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Theoretical lectures in class
6. Number of Credit Hours (Total) / Number of Units (Total)
4/6
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Laith Khalil Ibrahim Al-Taie Email: laith.altaie@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. To develop problem solving skills and understanding of Engineering mechanics (static) throughout the context of this course. 2. To understand the principles of engineering mechanics I like vector and non-vector quantities, units conversion. 3. This course also deals with force systems and their result. 4. To understand the basics of equilibrium of objects. 5. To understand force distribution in trusses and frames. 6. To perform force analysis using the joint method and the section method. students are supposed to be familiar with the following points: 1. Understanding vector and non-vector quantities, units conversion. 2. Understanding force system and their resultant. 3. Understanding the equilibrium. 4. Understanding forces in trusses and frames.

9. Teaching and Learning Strategies	
Strategy	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 some challenging problems to motivate students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Principles of statics, 1- basic concepts, 2- vector and non-vector quantities, 3- Units and their conversion	General introduction on principles of engineering static.	Theoretical lectures in class	Exam

2	4	Force systems and their result. 1-Force system, 2-Analysis	Principles of foce system and resultat.	Theoretical lectures in class	HW & Exam
3	4	3- Result of the converging forces, 4-Moment force	Converging forces and moment	Theoretical lectures in class	HW & Exam
4	4	5- couples, Problem solving + Quiz 1	Couples	Theoretical lectures in class	HW & Exam
5	4	6- The result of non-converging forces	Non-converging forces	Theoretical lectures in class	HW & Exam
6	4	Equilibrium. 1-concept of Equilibrium, 2- free body diagram, 3- Balance of parallel forces + Quiz 2	Equilibrium	Theoretical lectures in class	HW & Exam
7	4	4 - Equilibrium of bodies on which non-converging forces are applied	Equilibrium of bodies	Theoretical lectures in class	HW & Exam
8	4	introduction about Trusses and Frames	Trusses and frames	Theoretical lectures in class	HW & Exam
9	4	Trusses and Frames. 1-Trusses: A- Joints method part 1	Joint method	Theoretical lectures in class	HW & Exam
10	4	1-Trusses: A- Joints method part 2 + Quiz 3	Joint method	Theoretical lectures in class	HW & Exam
11	4	Trusses: B – Section method part 1	Section method	Theoretical lectures in class	HW & Exam
12	4	Trusses: B – Section method part 2 + Problem solving	Section method	Theoretical lectures in class	HW & Exam
13	4	2-Frames part 12-Frames part 1	Frames	Theoretical lectures in class	HW & Exam
14	4	2-Frames part 2 + Quiz 4	Frames	Theoretical lectures in class	HW & Exam
15	4	Problem solving	Frames	Theoretical lectures in class	HW & Exam
16	4	Preparatory week before the final Exam – review or open session for general questions	General Over review	Theoretical lectures in class	-

11. Course Evaluation

Evaluation type	**Degree, %**
4 quizzes	20
4 homework	20
Term exam	10
Final exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Engineering mechanics – Static, Alanaz, H., Ministry of higher education, 1990.
Main references (sources)	• Engineering Mechanics: Statics & Dynamics, 2022, Russell C. Hibbeler
Recommended books and references (scientific journals, reports…)	----------
Electronic References, Websites	----------

Course Description Form

1. Course Name:	
Engineering Drawing	
2. Course Code:	
DWRE 113	
3. Semester / Year:	
First/ 2025-2026	
4. Description Preparation Date:	
1/6/2025	
5. Available Attendance Forms:	
Experimental lectures in lab.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
90 hours/ 6 ECTS credits	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ahmed A. M. Al-Ogaidi, Email: a.alogaidi@uomosul.edu.iq Name: Ziyad Taher Ali, Email: ziyad.ali@uomosul.edu.iq Name: Ahmed A. Ahmed Email: ahmad.alkatan84@gmail.com	
8. Course Objectives	
Course Objectives	• To inform students about the importance of engineering drawing and the essential instruments. • To teach students different types of lines. • To teach students the basic geometrical constructions. • To introduce students to multi view drawing via theory of projection. • To teach students 3D drawing based on Isometric concept. • To imagine the complicated bodies by drawing sectional view.
9. Teaching and Learning Strategies	
Strategy	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 some challenging problems to motivate students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	6	Use the drawing instruments perfectly. Recognize the types of line and their uses.	Drawing instruments and types of lines	A lecture in the lab	HW and CW
2-4	18	Draw various geometric shapes depending on geometrical constructions.	Basic geometric constructions	A lecture in the lab	HW, CW, exam
5-9	30	Understand the theory of projection to draw the views of a certain body.	Theory of projection	A lecture in the lab	HW, CW, exam
10-13	24			A lecture in the lab	HW, CW, exam
14-15	12			A lecture in the lab	HW, CW, exam

11. Course Evaluation

Evaluation type	Degree
4 quizzes	16
14 homework	14
10 classwork	10
Term exam	10
Final exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	French, T.E., Vierck, C.J. and Hang, R.I., 1978. The Fundamentals of Engineering Drawing and Graphic Technology. McGraw-Hill.
Main references (sources)	• Morling, K., 2010. Geometric and Engineering Drawing 3E. Routledge. • Hanifan, R., 2014. Perfecting engineering and technical drawing: Reducing errors and misinterpretations (Vol. 139). Springer. Al-Khafaf, Abd Al-Rasul, Engineering Drawing, Technical University, Arabization and Publishing Centre, Baghdad, 1986.
Recommended books and references (scientific journals, reports…)	-------
Electronic References, Websites	https://www.coursera.org/search?query=engineering%20drawing

1. اسم المقرر:
اللغة العربية 1 / Arabic Language1
2. رمز المقرر:
UOM 1011
3. الفصل / السنة:
الأول/ 2025-2026
4. تاريخ إعداد هذا الوصف
2025/6/1
5. أشكال الحضور المتاحة :
حضورياً
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي):
عدد الساعات النظري (30)/ عدد الوحدات (2)
7. اسم مسؤول المقرر الدراسي (اذا اكثر من اسم يذكر)
المدرس : م.د ايناس عطوان سليمان
8. اهداف المقرر
- التعرف على أساسيات قواعد اللغة العربية – اكســاب الطالب المهارة في الكتابة العربية من تصــحيح الأخطاء الواردة في الكتابة ومعرفة القواعد النحوية والاملائية التي تصــون اللسان عن الخطأ - أن يفهم الطالب مدى أهمية اللغة العربية وقواعدها في الدراسات الانسانية وفي كتابة البحوث والتقارير - تنمية القدرة لدى المتعلم على التحدث باللغة العربية، ما أمك - تزويد المتعلم بالمادة اللغوية والمفاهيم الفكرية والمعارف الاملائية والنحوية والدلالية بحيث يتمكن بها من فهم واستيعاب النصوص وتطبيقها على أساليب الكلام - تمكين الطالب من القراءة الصحيحة.
9. استراتيجيات التعليم والتعلم
- الكتاب المنهجي. - الحلقات النقاشية - خلق محاضرة تفاعلية بين الطالب والأستاذ في عرض المادة - استعمال البور بوينت في توضيح موضوعات الدرس. - تكليف الطالب ببعض الأنشطة والواجبا ت.
10. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة / أو الموضوع	طريقة التعليم	طريقة التقييم
1	2	A1 : أن يعرف الطالب الكلمة ثم يذكراقسامها (الأسم– والفعل – والحرف)	اللغة العربية /اقسام الكلمة وتعريفاتها	محاضرات وتقارير	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
2	2	A4 : أ يفرق الطالب بين همزتين القطع والوصل في الفظ والكتابة	النطق بهمزة القطع والوصل	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
3	2	A5 : أن يميز الطالب في كتابة القواعد الاساسية لكتابة الهمزة بالشكل الصحيح	قواعد كتابة الهمزة	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة،
4	2	A4 : أن يفرق الطالب في كتابة التاء المربوطة والتاء المفتوحة في اخر الاسماء	كتابة التاء في اخر الكلمة	محاضرات	واجب بيتي
5	2	B6 : أن يبحث الطالب في المعاجم عن الخطوات التي يجب اتباعها عند الحاجة لمعرفة معنى كلمة ما	طريقة الكشف عن الكلمات في المعاجم العربية	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
6	2	A5 : ان يميز الطالب ويبين الفرق بين المبني والمعرب وعلامات الأعراب الأصلية والفرعية	المبني والمعرب وعلامات الاعراب الاصلية والفرعية	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
7	2	A2 :ان يفهم الطالب الجزئين الرئيسين للجملة الاسمية وهما المبتدء والخبر	الجملة الأسمية	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
8	2	C1 : ان يوضح للطالب اهم الاختلافات بين افعال المقاربة والرجاء وعملها للجملة الاسمية	افعال المقاربة والرجاء والشروع	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
9	2	A5 : ان يميز الطالب بين الاعداد المعربة والاعداد المبنية ويميز كذلك بين العرفة والنكره	احكام العدد من حيث الاعراب والبناء ومن حيث التعريف والتنكير	حل تمارين	اختبار شفهي
10	2	A1 : ان يعرف الطالب اهمية علامات الترقيم في الكتابة	علامات الترقيم	محاضرات	الامتحانات اليومية، الواجبات،

					النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
11	2	B2 : ان يظهر الفرق بين الاخطاء الاملائية والاخطاء اللغوية في الكتابة	الأخطاء اللغوية	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل
12	2	A2 : أن يشرح الطالب الافعال الناقصة والتغير الذي يحدث على الجملة الاسمية بدخولها عليها	الافعال الناقصة	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
13	2	C7: ان يبين الفرق بالنطق بين حرفين الضاد والظاء	النطق كتابة الضاد والظاء	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
14	2	A2 : ان يصنف الطالب الفرق بين المنقوص والمقصور والممدود	التغاير الصرفي	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
15	2	B8 : يكتب نبذه عن عناصر الشعر	الشعر وانواعه	محاضرات	واجب بيتي

11. تقييم المقرر
الحضور 1% الواجبات 4% اختبارات قصيرة (Quiz) 5% (الاسبوع الثالث، الاسبوع الخامس، الاسبوع السابع، الاسبوع التاسع، الاسبوع الحادي عشر) امتحان فصلي اول 15% (الاسبوع السادس) امتحان فصلي ثاني 15% (الاسبوع الرابع عشر) درجة السعي 40% الامتحان نهائي 60 % الدرجة النهائية 100%

12. مصادر التعلم والتدريس	
الكتب المقررة المطلوبة (المنهجية أن وجدت)	النحو الوافي – عباس حسن
المراجع الرئيسة (المصادر)	كتاب النحو المبسط ,للشيخ ادهم العاسمي
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	لايوجد
المراجع الإلكترونية، مواقع الانترنيت	لايوجد

Course Description Form

1. Course Name:
Introduction to Water Resources Engineering

2. Course Code:
DWRE 114
3. Semester / Year:
First/ 2025-2026
4. Description Preparation Date:
18/4/2025
5. Available Attendance Forms:
A theoretical lecture in the classroom
6. Number of Credit Hours (Total) / Number of Units (Total)
75 hours/ 3 ECTS credits
7. Course administrator's name (mention all, if more than one name)
Name: Abdulghani Khalaf Mohammed, Email: Alrobaai1982@uomosul.edu.iq
8. Course Objectives

Course Objectives	• **Introducing students to the importance of water resources for human life and what is the primary role of the dams and water resources engineer in managing and developing these resources and ways to preserve them.** • **Introducing students to the basic principles of irrigation and drainage engineering, modern and ancient irrigation methods, and ways to preserve water wealth.** • **Introducing students to the basic principles of studying fluid flow in pipes and open channels and the most important methods used to measure and control it.** • **Introducing the student to the concept of the hydrological cycle, the movement of water above and below the surface of the earth, and the study of evaporation from the surface of the soil and the surface of free water and the effect of weather factors on it.**

9. Teaching and Learning Strategies

Strategy	**The main strategy that will be adopted in offering this course is to familiarize the student with the basic principles of the three branches (irrigation and drainage, hydraulics and hydrology) in the field of dams and water resources, to be an introduction that helps the student to delve deeper into the study of these disciplines in the next academic stages. At the same time, improving and expanding critical thinking skills, and introducing him to the importance of water resources in achieving a decent life for humanity. This is achieved through theoretical lectures, scientific reports, field visits, and interactive panel discussions.**

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	General introduction to the Department of Dams and Water Resources Engineering and the curriculum	A brief overview of the three branches of the Department of Water Dam Engineering	**Theoretical lecture in the classroom**	
2-5	12	An introductory introduction to the basic principles of hydrology	Phases of the hydrological cycle/ Irrigation water sources/ Floods/ Dams and reservoirs / Types of Water reservoirs/Types of dams /catchment area /Classification of dams/Water sources in	**Theoretical lecture in the classroom**	Quizzes in the fifth week

			Iraq/Control and storage projects/Executed large dams.		
6-10	15	An introductory introduction to the basic principles of hydraulics	Hydraulic Structures/ Methods for measuring flow in open channels and pipes/Volumetric Measurements for discharge Measurement/ Velocity-Area Method for discharge Measurement/ Hydraulic Structures for discharge Measurement	**Theoretical lecture in the classroom**	Quizzes in the tenth week & Mid-course exam in the eighth week
11-15	15	An introductory introduction to the basic principles of irrigation and drainage	Irrigation projects in Iraq/Estimation of water consumption/Evapotranspiration/yield coefficient/Surface irrigation/sprinkler irrigation/ drip irrigation/Soil physical properties. Soil water forms/ Soil moisture content conventions/ Soil moisture content. irrigation efficiency/Water conduction efficiency/ water and consistency of distribution	**Theoretical lecture in the classroom**	Quizzes in the fifteenth week & Receiving scientific reports in the eleventh week

11. Course Evaluation

Evaluation type	**Degree**
3 quizzes	15
3 homework	15
1 Scientific report	10
Midterm exam	10
Final exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	**Irrigation and drainage book in Iraq and the Arab world. Written by Dr. Najeeb Kharofa, Dr. Mahdi Al-Sahhaf, Dr. Wafiq Al-Khashab**
Main references (sources)	**On-farm irrigation systems engineering\by A.Y.Hachum, and H.I.Yasin. textbook- Mosul University,1992.**
Recommended books and references (scientific journals, reports…)	**----------**
Electronic References, Websites	**https://www.coursera.org/search?query=engineering%20drawing**

Course Description Form

1. Course Name:
Computer 1
2. Course Code:
UOM 1031
3. Semester / Year:
First semester / 2024-2025
4. Description Preparation Date:
1/6/2023
5. Available Attendance Forms:
Theoretical & Experimental lectures in Computer lab.
6. Number of Credit Hours (Total) / Number of Units (Total)
75 hours/ 3 ECTS credits
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Talal Ahmed Basheer Email: t.basheer@uomosul.edu.iq Name: Omar Kanaan Taha Email: omar.alsultan@uomosul.edu.iq
8. Course Objectives

Course Objectives	**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).**
9. Teaching and Learning Strategies	
Strategy	**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.**

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1-2	6	Understand Computers and its components	Computers and Operating System	Theoretical & Experimental lectures in lab.	Exam and CW
3-4	6	Understand Computers and its components (Continued)	Software and Hardware Interaction	Theoretical & Experimental lectures in lab.	CW
5	3	Understand Computers and its components (Continued)	Windows File Management	Theoretical & Experimental lectures in lab.	CW & HW
6	3	Understand Computers and its components (Continued)	Operating System Customization	Theoretical & Experimental lectures in lab.	CW
7-8	6	Understand Computers and its components (Continued)	Computer Hardware	Theoretical & Experimental lectures in lab.	Exam and CW
9-10	6	Exploring Microsoft Office 2013	Exploring Microsoft Office 2013	Theoretical & Experimental lectures in lab.	CW
11	3	Learning to use Microsoft Word	Getting Started with Word Essentials	Theoretical & Experimental lectures in lab.	CW & HW
12	3	Learning to use Microsoft Word (Continued)	Editing and Formatting Documents	Theoretical & Experimental lectures in lab.	Exam and CW
13	3	Learning to use Microsoft Excel	Getting Started with Excel Essentials	Theoretical & Experimental	CW

				lectures in lab.	
14	3	Learning to use Microsoft Excel (Continued)	Organizing and Enhancing Worksheets	Theoretical & Experimental lectures in lab.	CW
15	3	Learning to use Microsoft Excel (Continued)	Creating Formulas and Charting Data	Theoretical & Experimental lectures in lab.	Exam and CW

11. Course Evaluation

Evaluation type	Degree
2 quizzes	10
2 homework	5
Report	5
Continues classwork	20
Term exam	10
Final exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	2015 Computer Literacy BASICS: A Comprehensive Guide to IC3 Connie Morrison, Dolores Wells, Lisa Ruffolo Cengage Learning. ISBN: 128576658X
Recommended books and references (scientific journals, reports…)	IC3 GS5 Certification Guide Using Windows 10 & Office 2016
Electronic References, Websites	Google Classroom

Course Description Form

1. Course Name:
geology
2. Course Code:
DWRE 117
3. Semester / Year:
1/2024-2025
4. Description Preparation Date:
1/9/2023
5. Available Attendance Forms:
Theoretical lectures in class and on line
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: Ghada y. Abdullah Email : g.alobaidy@uomosul.edu.iq Name: Arwaa A.Jamal Email :Arwa.abdalrazzaq@uomosul.edu.iq
8. Course Objectives

Course Objectives	5. To understand the types of Rocks and Engineering properties 6. Define hydrogeology and Hydrologic budget 7. Distinguish between Types of aquifers 8. This course deals with the basic concept of Geologic formations as aquifers. **9.** Calculate Porosity of rocks or soils in aquifers, groundwater movement, Permeability and Hydraulic Conductivity

9. Teaching and Learning Strategies	
Strategy	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 exercises involving some problems that are interesting to the students in Soil, Rocks and the water move underground scope.

10. Course Structure

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

1	3	Identify the origin of the Earth’s formation and the minerals it contains (i)	Earth's crust and components of the earth's crust, minerals and crystals	Theoretical lectures in class	
2	3	Distinguishing between rock types (i)	Igneous rocks	Theoretical lectures dnd on line	exam + homework
3	3		Metamorphic rocks, sedimentary rocks	Theoretical lectures in class	H.W & Exam
4	3	Identifying soil types from a geological and engineering perspective	Erosion, sculpting and soil formation	Theoretical lectures in class	H.W
5	3	Knowledge of soil properties through which soil permeability and moisture content are known (iii)	geological structures	Theoretical lectures in class	H.W
6	3	Description of hydrogeology and hydrological budget.(iii)	Engineering properties of rocks	Theoretical lectures in class	Exam
7	3	Identify the properties of rocks that have the ability to store groundwater (i)	Mechanical properties of rocks	Theoretical lectures in class	Monthly exam
8	3	Identifying and distinguishing between groundwater layers. (i)	Introduction to hydrogeology	Theoretical lectures in class	
9	3	Learn about the meaning of the term hydrology	Hydrologic budget	Theoretical lectures in class	
10	3	Introducing the student to the	Rock properties affecting groundwater	Theoretical lectures in class	Discuss reports

		concept of water budget			
11	3	Knowing the types of rocks that have the ability to store water	Types of aquifers		H.W
12	3	Determine the porosity of rocks or soil in aquifers and the movement of groundwater.(iii)	Geologic formations as aquifers		H.W
13	3	Explain the basic concept of geological formations of aquifers. (i)	Porosity of rocks or soils in aquifers		H.W
14	3	Apply Darcy's equation to calculate hydraulic conductivity (iii)	groundwater movement		
15	3	Knowing the depth of groundwater in the layers of the earth	Permeability and Hydraulic Conductivity		

11. Course Evaluation

Evaluation type	**Degree**
2 quizzes(3)	12
Assignments(5)	10
Report	8
Term exam(2)	20
Final exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	"STUDY GUIDE FOR A BEGINNIN-G COURSE IN GROUND-WATER HYDROLOGY" PART II. by O. Lehn Franke, Thomas E. Reilly, Ralph J. Haefner, and Dale L. Simmons. U.S.

	GEOLOGICAL SURVEY. Reston, Virginia 1993. •
Main references (sources)	"Basic Ground-Water Hydrology". RALPH C. HEATH. Prepared in cooperation with the North Carolina Department of Natural Resources and Community Development. Tenth printing, 2004. Ground Water". R. Allan Freeze and John A. Cherry. Printed in the United States of America. 1979 by Prentice-Hall. Inc., Englewood Cliffs, N.J. "Groundwater Hydrology". K.R. Rushton. 2003 John Wiley & Sons Ltd, the Atrium, Southern Gate, Chichester. "The Handbook of Groundwater Engineering". John H. Cushman, Daniel M. Tartakovsky. Published online on: 07 Nov 2016.
Recommended books and references (scientific journals, reports…)	----------
Electronic References, Websites	----------

Course Description Form

1. Course Name:

Mathematics II

2. Course Code:

DWRE 121

3. Semester / Year:

First/ 2025−2026

4. Description Preparation Date:

1/6/2025

5. Available Attendance Forms:

Lectures in the classroom

6. Number of Credit Hours (Total) / Number of Units (Total)

93 hours/ 6 ECTS credits

7. Course administrator's name (mention all, if more than one name)

Name:Ahmed yahay Abdulhafedh, Email: ahmed.abdulhafedh@uomosul.edu.iq

8. Course Objectives

Course Objectives	Knowledge of the Transcendental Functions, Inverse Functions, Derivatives and integral of inv trigonometric functions, Exponential and logarithmic functions, Derivatives and integrals involv logarithmic and exponential functions, Graphs and applications involving logarithmic and exponer functions, Hyperbolic functions, Hopital's Rule, An overview of integration methods: Trigonom substitutions, Trigonometric integral, Integration by parts, Integrating rational functions by partial fracti Numerical integration; Simpson's rule and Improper integrals.

9. Teaching and Learning Strategies

Strategy	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 some challenging problems to motivate students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	6	The student learns how to address transcendental functions	Transcendental Functions	A lecture in the classroom	HW and CW
2	6	The student learned how to derive and integrate inverse function equations	Inverse Functions	A lecture in the classroom	HW, CW, exam
3	6	The student learned how to solve integrals and inverse trigonometric functions	Derivatives and integral of inverse trigonometric functions	A lecture in the classroom	HW, CW, exam

4	6	The student learned to solve exponential and logarithmic functions	Exponential and logarithmic functions	A lecture in the classroom	HW, CW, exam
5-7	18	The student learned how to solve derivatives and integrals involving logarithmic and exponential functions	Derivatives and integrals involving logarithmic and exponential functions,	A lecture in the classroom	HW, CW, exam
8-9	12	The student learned how to draw applications and solutions of hyperbolic functions	Graphs and applications involving logarithmic and exponential functions, Hyperbolic functions	A lecture in the classroom	HW, CW, exam
10	6	The student learned how to solve limits using L'Hopital's rule	Hopital's Rule	A lecture in the classroom	HW, CW, exam
11-15	30	The student learned how to apply integrals that cannot be solved by direct application	An overview of integra methods: Trigonome substitutions, Trigonome integral, Integration by p Integrating rational funct by partial fractions, Numer integration; Simpson's rule Improper integrals.	A lecture in the classroom	HW, CW, exam

11. Course Evaluation

Evaluation type	**Degree**
4 quizzes	15
14 homework	15
10 classwork	10
Term exam	10
Final exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Calculus I By: Thomas
Main references (sources)	Calculus I By: Thomas 2018
Recommended books and references (scientific journals, reports…)	-------
Electronic References, Websites	-------

Course Description Form

1. Course Name:
Engineering mechanics 2
2. Course Code:
DWRE 122
3. Semester / Year:

2025-2026

4. Description Preparation Date:

1/9/2025

5. Available Attendance Forms:

Theoretical lectures in class

6. Number of Credit Hours (Total) / Number of Units (Total)

4/6

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Laith Khalil Ibrahim Al-Taie
Email: laith.altaie@uomosul.edu.iq

8. Course Objectives

Course Objectives	**1. To develop problem solving skills and understanding of Engineering mechanics (dynamic) throughout the context of this course.** **2. To understand the principles of engineering mechanics II like friction principals and types** **3. This course also deals with Centers and Centers of Gravity of bodies.** **4. To understand the basics of moment of Inertia.**

9. Teaching and Learning Strategies

Strategy	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 some challenging problems to motivate students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Friction	The nature of friction, mechanical friction, Coefficient of Friction, Friction issues	Theoretical lectures in class	Exam
2	4	Friction	wedges, Frictional forces in the belts	Theoretical lectures in class	HW & Exam
3	4	Centers and Centers of Gravity	The importance of centers, Centers of spaces and lines, Determination of centers by integration, Centers of compound shapes	Theoretical lectures in class	HW & Exam
4	4	Problem solving		Theoretical lectures in class	
5	4	**Moment of Inertia**	Units of measurement and signals, The moment of polar inertia, swirl radius, The equation for transferring the moment of inertia	Theoretical lectures in class	HW & Exam
6	4	**Moment of Inertia**	Moment of Inertia by Integration, The factorial of inertia, Maximum and minimum values of	Theoretical lectures in class	HW & Exam

			moment of inertia (Mohr circuit)		
7	4	Problem solving		Theoretical lectures in class	
8	4	**introduction Kinematics of Particles**	**introduction Kinematics of Particles**	Theoretical lectures in class	HW & Exam
9	4	**introduction Kinematics of Particles**	Rectilinear motion	Theoretical lectures in class	HW & Exam
10	4	**introduction Kinematics of Particles**	Plane curvilinear motion	Theoretical lectures in class	HW & Exam
11	4	Circular motion	Circular motion	Theoretical lectures in class	HW & Exam
12	4	Dynamic friction	Dynamic friction	Theoretical lectures in class	HW & Exam
13	4	**Work and energy**	Equations, Work and energy applications	Theoretical lectures in class	HW & Exam
14	4	Power	Power and Efficiency	Theoretical lectures in class	HW & Exam
15	4	Problem solving		Theoretical lectures in class	HW & Exam
16	4	Preparatory week before the final Exam – review or open session for general questions	General Over review	Theoretical lectures in class	-

11. Course Evaluation

Evaluation type	**Degree, %**
4 quizzes	20
4 homework	20
Term exam	10
Final exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Engineering mechanics – dynamic, Alanaz, H., Ministry of higher education, 1990.
Main references (sources)	• Engineering Mechanics: Statics & Dynamics, 2022, Russell C. Hibbeler
Recommended books and references (scientific journals, reports…)	----------
Electronic References, Websites	----------

Course Description Form

1. Course Name:
Computer Drawing
2. Course Code:
DWRE 123
3. Semester / Year:
Second semester / 2025−2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Theoretical & Experimental lectures in lab.
6. Number of Credit Hours (Total) / Number of Units (Total)
150 hours/ 6 ECTS credits
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Talal Ahmed Basheer Email: t.basheer@uomosul.edu.iq Name: Omar Kanaan Taha Email: omar.alsultan@uomosul.edu.iq

8. Course Objectives	
Course Objectives	The module aims to shed light on how to use one of the most important computer aided drawing software - AutoCAD software - reviewing the most important information that the users need to utilize the most common program vision, to produce and extract 2D and 3D drawings. Qualifying students of the Dams and Water Resources Engineering Department to use the AutoCAD software to competently and efficiently realize engineering drawings, and assist them in implementing the details of the designs required in their projects.
9. Teaching and Learning Strategies	
Strategy	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.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	6	Learn the basics of coordinate systems & AutoCAD program	Introduction - AutoCAD program interface elements, Coordinate systems in the program, Drafting Settings: Grid, Snap, Ortho	A lecture in the lab	CW
2	6	Learn the AutoCAD drawing commands	Drawing commands: Line, Circle	A lecture in the lab	CW
3	6	Learn the AutoCAD drawing commands (Continued)	Drawing commands: Polygon, Rectangle	A lecture in the lab	CW & Exam
4	6	Learn the AutoCAD Modifying commands	Modify tools: Erase, Copy, Move	A lecture in the lab	CW
5	6	Learn the AutoCAD Modifying commands (Continued)	Modify tools: Mirror Rotate, Scale	A lecture in the lab	CW
6	6	Learn the AutoCAD assistant tools	Object Snap, View – Zoom, View - Pan	A lecture in the lab	CW
7	6	Learn the AutoCAD Modifying commands	Modify tools: Offset, Rectangular and Polar Array	A lecture in the lab	CW & HW
8	6	Learn the AutoCAD Modifying commands (Continued)	Modify tools: Stretch, Trim, Extend	A lecture in the lab	CW
9	6	Learn the AutoCAD drawing commands	Drawing Commands: Point, Divide, Hatch	A lecture in the lab	CW

10	6	Learn the AutoCAD drawing commands (Continued)	Drawing Commands: Text, Mtext	A lecture in the lab	CW & HW
11	6	Learn the AutoCAD Modifying commands	Modify tools: Chamfer, Fillet, Explode	A lecture in the lab	CW
12	6	Learning to use layers & drawing property	Layers and drawing element settings: Color, Linetype, Line Weight, Text Style	A lecture in the lab	CW & Exam
13	6	Learning to use dimensions	Dimensions and measurements	A lecture in the lab	CW
14	6	Learning how to print drawings	Printing and output	A lecture in the lab	CW
15	6	Learning the basic of three dimension drawing	Basics of 3D Drawings	A lecture in the lab	CW

11. Course Evaluation

Evaluation type	Degree
2 quizzes	10
2 homework	10
Report	10
Continues classwork	10
Term exam	10
Final exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	
Recommended books and references (scientific journals, reports…)	Al-Allaf, Emad Hani, Architectural and Computer Aided Engineering Drawing, 2D Drawing Principles in AutoCAD®, 2018.
Electronic References, Websites	https://www.mycadsite.com

Course Description Form

1. Course Name:
Statistics
2. Course Code:

DWRE124	
3. Semester / Year:	
2/2025-2026	
4. Description Preparation Date:	
1/9/2025	
5. Available Attendance Forms:	
Theoretical lectures in class	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3/4	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Saleh Mohammed Saleh Email: s.zakaria@uomosul.edu.iq Name: Dr. Muhanad Talal Yousif Email: mohanad_alsheer @uomosul.edu.iq	
8. Course Objectives	
Course Objectives	The aim of this course is to introduce the students to the field of processes and practices of engineering statistics . Engineering statistics combines engineering and statistics using scientific methods to analyze data. This course will discuss some basic principles of engineering statistics, and introduces students to the fundamental concepts of Nature of statistical data and symbols, Viewing the data, Measures of central tendency, Measures of the mean, dispersion, and range. The average deviation, variance, coefficient of variation, binomial distribution, normal distribution, Principles of probability theory and hypothesis testing approach, Which is one of the most important topics in the field of making a decision to accept or reject the statistical hypothesis In addition to deal with the details of some statistical tests which include Chi square test, T-test and F-test, in addition to the Regression and correlation, the drawing method, the least squares method, the linear correlation. At the end of the course, students will have the necessary knowledge to conduct statistical analysis using statistical tests, determine the extent of data correlation, and have the ability to make a decision to accept or reject a statistical hypothesis, , 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 engineering statistics reporting and supervised tutorials.
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises in addition lectures, individual & group assignments, and e-learning platforms, while at the same time refining and expanding their critical thinking skills. Exercises involving the use of statistical vocabulary and componentsto understand the engineering statistical processes. The course will be taught in Arabic , and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams. This will be achieved through classes, interactive tutorials and by considering some challenging problems to motivate student
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Knowing the types and Nature of statistical data and symbols	Introduction, Nature of statistical data and symbols,	Theoretical lecture in class	HW
2	3	data analysis using table and drawing methods	Viewing the data, the table method, the drawing method.	Theoretical lecture in class	HW
3	3	Measures of central tendency and Knowing arithmetic mean, median, and mode	Measures of central tendency, the arithmetic mean, median, and mode	Theoretical lectures in class	Exam
4	3	Measures of the mean, dispersion, and range	Measures of the mean, dispersion, and range	Theoretical lectures in class	HW
5	3	Determination: average deviation, variance, coefficient of variation	The average deviation, variance, coefficient of variation	Theoretical lectures in class	Quizzes & HW
6	3	Knowing the Principles of probability theory	Principles of probability theory	Theoretical lectures in class	HW
7	3	Knowing the conditional probability	conditional probability.	Theoretical lectures in class	Midterm Exam
8	3	Analysis Statistical problems using Binomial distribution	Binomial distribution	Theoretical lectures in class	Assignment
9	3	Analysis Statistical problems using normal distribution	normal distribution.	Theoretical lectures in class	HW
10	3	Knowing the Hypothesis testing approach	Hypothesis testing approach.	Theoretical lectures in class	online Assignment
11	3	Analysis Statistical problems using Z- test	Statistical tests , Z- test.	Theoretical lectures in class	HW
12	3	Analysis Statistical problems using Chi square - test.	Chi square test .	Theoretical lectures in class	Report
13	3	Analysis Statistical problems using F-test .	F-test .	Theoretical lectures in class	HW
14	3	Analysis Statistical problems using Regression and correlation	Regression and correlation .	Theoretical lectures in class	HW
15	3	Analysis Statistical problems using least squares method , the linear correlation	the drawing method, the least squares method , the linear correlation.	Theoretical lectures in class	HM

11. Course Evaluation

Evaluation type	Degree
Quizzes	10
Assignment (HW) (each 1 pt)	10
online Assignment (classwork)	5
Report	10
Midterm Exam	15

Final Exam	50
Total	100
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• Introduction to Statistics, Dr. Khasha Mahmoud Al-Rawi, College of Agriculture and Forestry, University of Mosul, 2nd Edition, 2000..
Main references (sources)	• An Introduction to the Science of Statistics: From Theory to Implementation, Preliminary Edition, Joseph C. Watkins
Recommended books and references (scientific journals, reports…)	----------
Electronic References, Websites	----------

Course Description Form

1. Course Name:
Chemistry
2. Course Code:
DWRE 125
3. Semester / Year:
2/2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Theoretical lectures in class and labrotory
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. Omar Muqdad Abdulgany Email: O.agha@uomosul.edu.iq Name: alaa ismaeil naser Email:. alaa @uomosul.edu.iq Name:arwa abd alrazzaq jamal. Email: arwa.abdalrazzaq@uomosul.edu.iq
8. Course Objectives

Course Objectives	The aims of this topic 1. To gain an understanding of the environment and the different types of environmental pollution. 2. To understand the quantitative and qualitative distribution of water in the world and the hydrological cycle of water from a quantity perspective.

	3. To learn about the properties of water sources and how they can become polluted. 4. To understand the impact of engineering projects on water quality and self-purification. 5. To study the effect of decomposition rate (decomposition constant) on the amount of oxygen required in the process of waste decomposition. 6. To analyze the effect of the quality and quantity of wastewater entering and leaving a lake. 7. To study the deficit of oxygen in the water and the processes of reaeration and deoxygenation. 8. To investigate the effect of wastewater on rivers and the different types of pollution that can occur. 9. To understand the impact of detergents on water pollution. 10. To study the different types of pollution that can affect rivers and their ecosystems.

9. Teaching and Learning Strategies

Strategy	To ensure effective learning of water quality and pollution, the teaching strategies employed should be engaging and equip students with the relevant knowledge and skills. This can be achieved through problem-solving exercises, case studies, and fieldwork. Collaborative learning in groups promotes teamwork, communication, and critical thinking skills. Regular feedback and reflection help students identify areas for improvement and consolidate their learning. Case studies are also useful in illustrating the impact of water pollution on different environments and ecosystems and emphasize the importance of protecting water resources. By utilizing these strategies, students can gain a deeper understanding of water quality and pollution, and develop the skills necessary to become effective professionals in this field.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Understand what the water cycle in nature means (i)	Introduction to Environment Lab 1: Solids, Dissolved and Suspended solids, and total solids	Theoretical lectures and labrotory	

2	3	Understand what the water cycle in nature means (i)	Hydrological Cycle of water from quantity sides. Lab 1: Solids, Dissolved and Suspended solids, and total solids	Theoretical lectures and labrotory	H.W + practical experience report
3	3	Identify the main sources of water pollution and the different types of pollutants. (i) Knowing the limits at which water is classified as suitable for drinking or not (iii)	Properties of water sources, how water sources polluted. Lab 2: Turbidity	Theoretical lectures and labrotory	practical experience report
4	3	Project management and solutions (iii)	Effect of engineering project on water quality and self-purification. Lab 2: Turbidity	Theoretical lectures and labrotory	practical experience report
5-6	3	Identify the reasons for non-organic decomposition and organic decomposition with oxygen and calculate the decomposition constant (i) The student learns to use pH meters and know the acidity and basicity of water (iii)	Effect of decomposition rate (decomposition constant) on the amount of oxygen required in the process of waste decomposition Lab 3: PH-value Electrical Conductivity.	Theoretical lectures and labrotory	Daily exam + practical experience report

7	3	To be able to calculate changes in dissolved oxygen, anoxia, and biological oxygen demand (BoD) along a river course due to wastewater. (iii)	Calculate the change of dissolved oxygen along the riverbed due to wastewater. Lab 3: PH-value& Electrical Conductivity.	Theoretical lectures and labrotory	practical experience report
8	3		Mid-term Exam Lab 4: Electrical onductivity	Theoretical lectures and labrotory	Monthly exam
9	3	To be able to calculate changes in dissolved oxygen, anoxia, and biological oxygen demand (BoD) along a river course due to wastewater. (iii) Knowing the salt concentration of water through a salinity measuring device (iii)	Calculate the change of deficit oxygen along the riverbed due to wastewater. Lab 4: Electrical Conductivity	Theoretical lectures and labrotory	practical experience report
10	3	To be able to calculate changes in dissolved oxygen, anoxia, and biological oxygen demand (BoD) along a river course due to wastewater. (iii)	Calculate the change of BoD along the riverbed due to wastewater Lab 5: Hardness	Theoretical lectures and labrotory	Daily exam Practical experience report

11-12	3	Be able to calculate the impact of the quality and quantity of wastewater entering and leaving the lake.(i) Learn water hardness limits and calcium and sodium concentrations (iii)	Effect of the quality and quantity of wastewater entering and leaving the lake. Lab 5: Hardness	Theoretical lectures and labrotory	H.W Practical experience report
13	3	Be able to calculate the impact of the quality and quantity of wastewater entering and leaving the lake.(i)	Seasonal inversion in lakes, Effect of detergents on the pollution of the water Lab 6: Dissolved Oxygen	Theoretical lectures and labrotory	Practical experience report
14	3	Gain experience and understand the types of pollution and ways to treat them (iii) Knowing the extent of the effect of low oxygen on aquatic organisms (iii)	Study the type of pollution on the river. Lab 6: Dissolved Oxygen	Theoretical lectures and labrotory	Practical experience report
15	3	Identifying the causes of pollution and finding appropriate solutions to solve the	Wastewater treatment.	Theoretical lectures and labrotory	Practical experience report

		pollution problem (iii)			
16	3	Preparatory week before the final Exam			

11. Course Evaluation

Evaluation type	**Degree**
quizzes 2	10
Homework 2	10
Report 1	5
Project labrotory 1	15
Term exam	10
Final exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• د. طارق احمد محمود " علم و تكنولوجيا البيئة " كتاب منهجي لمادة هندسة البيئة – جامعة الموصل –كلية الهندسة.
Main references (sources)	•
Recommended books and references (scientific journals, reports…)	----------
Electronic References, Websites	----------

Course Description Form

1. Course Name:
Human Rights and Democracy
2. Course Code:
UOM 1040
3. Semester / Year:
/2/ 2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
My presence
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: sarah ahmed hamad Sarah_law @uomosul.edu.iq
8. Course Objectives

-Understanding, knowing, a realizing the rights that God Almigl has granted to all human beings. Th are a gift, not a gain for anyone, a no one has the right to take th away. - The student expresses and defer these rights in his own way - Explaining phenomena and givi explanations for the violations rights that occur before him - Identifying deficiencies and gaps light of the information available the course	
9. Teaching and Learning Strategies	
Strategy	- In-person education, through which the following teaching methods were used: - lecture - Discussion - Brainstorming - Problem Solving

	- Assigning the student to prepare a report - In addition to e-learning support, which was done through t classroom • Homework •

10. Course Structure

Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	week
	Theoretical leacture	Introduction/The concept of human rights	The student should know an introduction to rights(v)	2	1
	Theoretical leacture	Definition of right	The student must know the correct language and terminology (v)	2	2
	Theoretical leacture	Definition of human	The student should know the definition of a human being(v)	2	3
Daily exam + H.W	Theoretical leacture	Legal personality and its features	That the student understands the concept of legal personality and its feature(iv)	2	4
	Theoretical leacture	Historical development of the concept of rights and freedoms	The student should enumerate the historical development of rights and freedoms(v)	2	5
	Theoretical leacture	Rights and freedoms in Eastern civilizations	The student should know Eastern civilizations(iv)	2	6

	Theoretical leacture	Rights and freedoms in Eastern civilizations	The student should know Western civilizations(v)	2	7
Mid exam	Theoretical leacture	The historical development of the idea of rights in the ages	The student should know the rights of the ages(v)	2	8
	Theoretical leacture	Rights and freedoms in heavenly laws	The student should enumerate the heavenly laws(v)	2	9
	Theoretical leacture	Rights and freedoms in the Christian religion	The student should know the rights in the Christian religion(v)	2	10
Daily exam	Theoretical leacture	Rights and freedoms in the Islamic religion	That the student understands the rights and freedoms in the Islamic religion(iv)	2	11
H.W	Theoretical leacture	Development in the concept of human rights throughout the modern era	To talk about human rights throughout the modern era(v)	2	12
	Theoretical leacture	Review and discuss		2	13
	Theoretical leacture	Modern trends in rights a freedoms	The student shou enumerate modern trends rights and freedon (v)	2	14
Discuse	Theoretical leacture	Discusse report		2	15

11.Course Evaluation

very good

12.Learning and Teaching Resources

Evaluation type	**Degree**
2 quizzes(2)	20

Report(1)	10
H.w(2)	10
Mid exam 1	10
Final exam	50
Total	100
Required textbooks (curricu books, if any)	computer
Main references (sources)	Curriculum
Recommended books and references (scientific journals, reports...)	https://classroom.google.com/c/NjM4NDkzMTgyNjk4?cjc=dlbklgw
Electronic References, Websites	Google scholar Youtube

Course Description Form

1. Course Name:
English I
2. Course Code:
UOM 1021
3. Semester / Year:
2/2025−2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Theoretical lectures 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. Saleh Mohammed Saleh Email: s.zakaria@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. The main objective of this course is to emphasize the fundamental language skills of reading, writing, speaking, listening, thinking, viewing, and presenting. 2. The course includes studies of various literary genres: short story, novel, and non-fiction. 3. The course also helps students to improve their English language grammar and reading abilities, and becoming more effective use of grammar and natural self-expression in English.

9. Teaching and Learning Strategies

Strategy	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	The students will attain and enhance competence in the four modes of literacy: writing, speaking, reading and listening.	Unite 1 : A world of difference: Tenses * Auxiliary verbs * What's in a word? Everyday situations	Theoretical lecture in class	HW
2	2	Students will heighten their awareness of correct usage of English	Starter : Tenses and auxiliary verbs, Each question has one word missing. Write it in, T 1.1	Theoretical lecture in class	HW

		grammar in writing and speaking.	Listen and check your answers, GRAMMAR SPOT, Write your own quiz,		
3	2	Students will improve their speaking ability in English both in terms of fluency and comprehensibility.	PRACTICE You're so wrong!, T 1.2 Listen and check, s=is or has?, T 1.3 Listen to some more sentences with 3, Talking about you, MAKING CONVERSATION, Short answers	Theoretical lectures in class	HW
4	2	Students will give oral presentations and receive feedback on their performance.	T 1.4 Ruth is collecting her children, SPOKEN ENGLISH Sounding polite, PRACTICE 1 Match a line in A with a short answer in B anda line in C., T 1.6 Listen and check. Practise with a partner. Pay attention to stress and intonation, class survey, Check it	Theoretical lectures in class	HW & Quizzes
5	2	Students will increase their reading speed.	READING AND SPEAKING Worlds apart, Discuss these questions about your family, The Kamaus from Kenya, The Qus from Beijing, China, LISTENING AND SPEAKING A world in one family, T 1.7 Listen to Xabier talking about his family, T 1.8 Listen to Xabier's mother, What do you think?	Theoretical lectures in class	Monthly Exam
6	2	Students will improve their reading fluency skills through extensive reading.	Unit 2 : The working week Present tenses « Passive * Free time activities * Making small talk, Starter : MY FAVOURITE DAY OF THE WEEK Present tenses — states and activities , T 2.2 Listen to them talking about their favourite day of the week. What is it? Why?	Theoretical lectures in class	HW
7	2	Students will enlarge their vocabulary.	GRAMMAR SPOT, PRACTICE Questions and answers, T 2.3 Listen and check, T 2.4 Listen and check, Talking about you, Dave Telford police officer and surfer	Theoretical lectures in class	HW
8	2	the students will attain and enhance competence in the four modes of literacy: writing,	Simple and continuous T 2.5 Listen to two people talking about who's who in The Office. What are	Theoretical lectures in class	Midterm Exam

		speaking, reading and listening.	their names? What are their jobs?, Work with a partner. Read the conversation aloud.		
9	2	Students will heighten their awareness of correct usage of English grammar in writing and speaking.	Interview someone you know about his/her job. Tell the class about this person, Activity verbs, Active and passive, STATISTICS ABOUT JOBS AND MONEY IN THE UK, Put the verbs in the present passive, simple or continuous, LISTENING AND SPEAKING Who earns how much?	Theoretical lectures in class	HW & Quizzes
10	2	Students will improve their speaking ability in English both in terms of fluency and comprehensibility.	T 2.6 Listen to Part 1. Answer the questions. T 2.7 Listen to Part 2. Answer the questions, Soken English Giving opinions, READING AND SPEAKING Charles, Prince of Wales, VOCABULARY AND SPEAKING Free time activities	Theoretical lectures in class	HW
11	2	Students will give oral presentations and receive feedback on their performance.	T 2.8 Listen to John talking about his hobby, EVERYDAY ENGLISH Making small talk, T 2.9 Read and listen to the conversation, Spoken English: Softening negative comment, T 2.10 Listen to the questions and answer, T 2.11 Listen and compare.	Theoretical lectures in class	Report
12	2	Students will increase their reading speed.	Unite 3 : Good times, bad times, past tenses, spelling and pronunciation, Giving opinions, Starter: play the Fortunately, Unfortunately game around the class, VINCENT VAN GOGH,	Theoretical lectures in class	Quizzes
13	2	Students will improve their reading fluency skills through extensive reading.	Past tenses and used to, incent Van Gogh, the genius unrecognized in his own lifetime, GRAMMAR SPOT: In these sentences, which verb form is ...? Past Simple Past Continuous Past Simple passive,	Theoretical lectures in class	HW
14	2	Students will enlarge their vocabulary.	Pronunciation, practice , didn't do much, Discussing grammar, A	Theoretical lectures in class	HW

			newspaper story, Dictation, SMASH! , Clumsy visitor destroys priceless vases By Tom Ball, VOCABULARY, Spelling and pronunciation, Words that sound the same, Spelling, Lost sounds, READING, A Shakespearean tragedy,		
15	2	English writing practice for beginners.	The first time I fell in love, What do you think? ,VERYDAY ENGLISH, Giving opinions, SPOKEN ENGLISH Making an opinion stronger	Theoretical lectures in class	HM

11. Course Evaluation

Evaluation type	**Degree**
Quizzes	10
Assignment (HW) (each 1 pt)	10
Report	10
Monthly Exam	10
Midterm Exam	10
Final Exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Ronald Carter and Michael McCarthy. Cambridge grammar of English: A comprehensive guide. Cambridge: Cambridge University Press, 2006.
Main references (sources)	• Rodney Huddleston, Geoffrey K. Pullum. The Cambridge Grammar of the English Language, 2002.
Recommended books and references (scientific journals, reports…)	----------
Electronic References, Websites	----------

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	3	1	DWRE 211	Mathematics III	الرياضيات III	English	2				2		3	63	62	125	5.00	B	
		2	DWRE 212	Fluid Mechanics I	ميكانيك الموائع I	English	2		2		2		3	93	57	150	6.00	C	
		3	DWRE 213	Strength of Materials	مقاومة المواد	English	2	1			2		3	78	72	150	6.00	B	
		4	DWRE 214	Surveying	المساحة	English	2		2		1		3	78	22	100	4.00	C	
		5	UOM 2032	Computer II	حاسوب II	English	1		2				3	48	27	75	3.00	B	
		6	DWRE 216	Building Construction	انشاء المباني	Arabic	2		2				3	63	37	100	4.00	C	
		7	UOM 2012	Arabic 2	اللغة العربية 2	Arabic	2						3	33	17	50	2.00	B	
				Total Weekly Hours		29	13	1	8	0	7	0	21	423	294	750	30.00		

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	4	1	DWRE 221	Differential Equations	معادلات تفاضلية	English	2				2		3	63	62	125	5.00	B	
		2	DWRE 222	Fluid Mechanics II	ميكانيك الموائع II	English	2		2		1		3	78	47	125	5.00	C	DWRE 212
		3	DWRE 223	Structures	منشات	English	2	1			2		3	78	72	150	6.00	B	
		4	DWRE 224	Areas and Volumes	المساحات والحجوم	English	2		2		1		3	78	22	100	4.00	C	
		5	DWRE 225	Physics and Soil Science	فيزياء وعلوم التربة	Arabic	3		2		1		3	93	57	150	6.00	C	
		6	UOM 2022	English 2	اللغة الإنكليزية 2	English	2						3	33	17	50	2.00	B	
		7	UOM 2050	Baath Crimes in Iraq	جرائم نظام البعث في العراق	Arabic	2						3	33	17	50	2.00	B	
				Total Weekly Hours		29	15	1	6	0	7	0	21	456	294	750	30.00		

Course Description Form

1. Course Name:
Mathematics III
2. Course Code:
DWRE 211
3. Semester / Year:
First/ 2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Theoretical lectures in class.
6. Number of Credit Hours (Total) / Number of Units (Total)
4/2
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Muhanad Talal Yousif Email: mohanad_alsheer@uomosul.edu.iq
8. Course Objectives

Course Objectives	○ Understanding of the fundamental concepts of polar coordinates system (i) ○ Used polar coordinates system to calculate the area and curve length (ii) ○ Define vector and unite vector (i) ○ Apply the principle of scalar and vector products to solve some problems (ii) ○ Using vector approach to find plane equation and line equation (ii) ○ Using vector approach to find the angle between plane (ii)

9. Teaching and Learning Strategies

Strategy	Power point presentation and multimedia tools are used in classrooms; Examples and problems will be solved and illustrated on the classroom board; Tutorials are also organized to establish a closer contact with students. The course objects demonstrate sequence in mathematics III primarily for students intending to major in a field of dams and water resources engineering.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	12	Understanding of the fundamental concepts of polar coordinates system	Introduction to polar coordinate system and Symmetry of polar coordinate graphs	A lecture in class	H.W, C.W and Exam
4-6	12	Used polar coordinates system to calculate the area and curve length	area and length in polar coordinate system	A lecture in class	H.W, C.W and Exam
7-9	8	Define vector	Vector component and the length of vector, vector in space	A lecture in class	H.W, C.W and Exam
10-12	12	Apply the principle of scalar and vector products to solve some problems	Product of two vectors (The scalar product), Vector projections; Orthogonal vectors	A lecture in class	H.W, C.W and Exam
13-15	12	Apply the principle of scalar and vector products to solve some problems	Lines in the plane and distance from points, The cross products (vector product), Equation of lines and planes, Angles between planes	A lecture in class	H.W, C.W and Exam

11. Course Evaluation	
Evaluation type	**Degree**
3 Exam	30
3 homework	6
2 classwork	4
Final exam	60
Total	100
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	"Calculus". Ross L Finney and George B. Thomas. Copyright by Addison Wesley Publishing Company, 1990.
Main references (sources)	"THOMAS CALCULUS" George B. Thomas. Printed in the United States of America., 2014.
Recommended books and references (scientific journals, reports…)	_____
Electronic References, Websites	_____

Course Description Form

1. Course Name:
Fluid Mechanics 1
2. Course Code:
DWRE 212
3. Semester / Year:
First 2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Lectures and Tutorials
6. Number of Credit Hours (Total) / Number of Units (Total)
6hr/6 cridits

7. Course administrator's name (mention all, if more than one name)

Name: Azza Nasralla Jarall Al-talib Email: a.altalib@uomosul.edu.iq

8. Course Objectives

Course Objectives	The fluid mechanics is the basic subject for second-stage students in the dams and w resources engineering department that from this subject student will learn and practice to f properties (units and dimensions, Density, Specific weight. Viscosity, Surface tens Capillarity. Fluid static (pressure–density–height relationships). Absolute pressure and g pressure, types of pressure gages. Force on submerged plane surfaces. Force on submer curved surfaces. Applied problem about gates, dams ……etc. Stability of submerged floating bodies. This achieved by theoretical lecturers.

9. Teaching and Learning Strategies

Strategy	The strategy is to provide theoretical lectures using presentatic and question solving in an interactive way with students inside the classroom, as well as tutorials exercises.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction	Introduction	Presentation And white board	Monthly exam
2	2	Fluid properties – Units and D Density, Specific weight,	Fluid properties – U and Dimensions, Den Specific weight,	Presentation And white board	Monthly exam
3	2	Compressibility, Elasticity. Surface tension, Capillarity	Compressibility, Elasticity. Visco Surface tension, Capilla	Presentation And white board	Monthly exam
4&5	4	Fluid static (pressure–dens relationships).	Fluid static (press density–height relationships).	Presentation And white board	Monthly exam
6	2	Fluid static (pressure–dens relationships).	Fluid static (pressur height relationships	Presentation And white board	Monthly Exam
7	2	exam			
8&9	4	Absolute pressure and gage types of pressure gages	Absolute pressure a pressure,. types o gages	Presentation And white board	Monthly Exam
10	2	Force on submerged plane surfa	Force on submerg surfaces.	white board	Monthly Exam
11	2	Stability of submerged and floati	Stability of subme floating bodies.	white board	Monthly Exam
12	2	Applied problem about gat ……etc.	Applied problem ab dams ……etc.	white board	Monthly Exam
13	2	Applied problems on St submerged and floating bodi	Applied problen Stability of subm floating bodies	white board	Monthly Exam
14	2	exam			

15	2	Preparatory week before the final Exam

Laboratory Experiments:

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Learn how to write the Report	Writing report	presentation	Experimental reports
2,3,4	6	Center of Pressure of Immersed Surface	Learn Center of Pressure Immersed Surface	Laboratory experiments	Experimental Reports
4,6,7	6	Reynolds Number in Pipe	Reynolds Number in Pipe	Laboratory experiments	Experimental reports
8,9,10	6	Forces due to Jet Impact on Plates	Calculate Forces due to Jet Impact on Plates	Laboratory experiments	Experimental reports
11,12 ,13	6	Learn Discharge by oriface Meter	Discharge Measurements by orifice Meter	Laboratory experiments	Experimental reports
14&15	4	Final lab exam			

11. Course Evaluation	
Evaluation type	**degree**
2 Quizzes	10
2 h.w.	10
lab	20
Mid exam	10
Final exam	50
total	100

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Vennard, J.K., 1963. Elementary fluid mechanics. edition.
Main references (sources)	Rajput, R.K., 2004. *A textbook of fluid mechanics hydraulic machines*. S. Chand Publishing.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://uclouvain.be/en-cours-2023-lbres2104

Course Description Form

1. Course Name:
Strength of Material
2. Course Code:
DWRE213
3. Semester / Year:
Fall 2025–2026
4. Description Preparation Date:
August 15, 2025
5. Available Attendance Forms:
Theoretical lectures in class
6. Number of Credit Hours (Total) / Number of Units (Total)
6 / 5
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Saddam M. AHMED Email: ahmed.saddam@uomosul.edu.iq

8. Course Objectives	
Course Objectives	In DWRE 213, initially students will learn how to analysis and assess the Internal strength and deformation for systems. Upon successful completion of this course the student shall be able to assess the: - Evaluate the mechanical properties of systems. - Analyze axially loaded bars and trusses. - Design axially loaded bars and trusses. - Evaluate shear stresses and design joints and bolts. - Evaluate deformation and stress in cables and analyze indeterminate systems. - Evaluate shear stresses and deformation and design torsional systems. - Evaluate beam mechanical properties, including maximum shear and bending moments. - Analyze behavior of members under bending. - Evaluate stress deformation due to combined loading (force and bending). - Evaluate maximum deformation and slope in systems. - Evaluate principal and maximum in-plane shear stresses using Mohr's circle, and absolute maximum shear stress, plane strain.
9. Teaching and Learning Strategies	

Strategy	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 some challenging problems to motivate students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	i	Introduction, syllabus, equilibrium conditions of rigid bodies, structural analysis	Lectures	Ass 1
2	5	i	Structural analysis, average normal stress in axially loaded beams, stress in simple trusses	Lectures	HW1
3	5	i	Shear stress, allowable stress, design of simple joints	Lectures	Ass 2
4	5	i	Deformation and stress in cables, analysis of indeterminate structures	Lectures	Quiz 1, HW2
5	5	i	Torsional deformation of circular shafts, torsion formula, power transmission, angle of twist	Lectures	Report1
6	5	i	Shear stress and deformation in beams and shafts due to torsion	Lectures	Ass3
7 & 8	10	i	Shear and bending moment diagrams, graphical method, beam deflection, bending formula, unsymmetrical bending, stress concentrations	Lectures	Quiz 2, HW3
9	5		Shear in straight members, shear formula, shear flow in built-up members	Lectures	Report 2
10	5		Stress due to combined loading	Lectures	Ass4
11 & 12	10		Elastic curve, slope and deflection by integration, moment-area method	Lectures	HW4
13	5		Plane stress, general plane stress transformation equations, principal stresses, maximum in-plane shear	Lectures	Ass5
14	5		Mohr's circle for plane stress, absolute maximum shear stress, Mohr's circle – material composition and quality relationships	Lectures	HW5

11. Course Evaluation

Evaluation type	Degree
Two Quizzes (7 pts each)	14 pts
Midterm Exam	14 pts
Homework (best 4 out of total, 2 pts each)	8 pts
Assignments (best 4 out of total, 2 pts each)	8 pts
Two Reports (3 pts each)	6 pts
Final Exam	50 pts
Total	100 pts

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	R C., HIBBELER (**2011**) "Mechanics of Materials", eight Edition, PEARSON, ISBN 13:

	978-0-13-602230-5, USA. (can be downloaded from the Course web page).
Main references (sources)	R C., HIBBELER (2011) "Mechanics of Materials", eight Edition, PEARSON, ISBN 13: 978-0-13-602230-5, USA. (can be downloaded from the Course web page).
Recommended books and references (scientific journals, reports…)	----------
Electronic References, Websites	----------

Course Description Form

1. Course Name:
Surveying
2. Course Code:
DWRE 214
3. Semester / Year:
First/ 2025−2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.
6. Number of Credit Hours (Total) / Number of Units (Total)
10 hours/ 4credits
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Omar Muqdad Abdulgany, Email: o.agha@uomosul.edu.iq Name: Alaa Ismael Nasar, Email: engalaaismail79@uomosul.edu.iq
8. Course Objectives

Course Objectives	Surveying I aims to teach students how to measure distances through obsta construction and adjustment of levels, Measurement a long straight line offset, Method locating a point or the types of coordinates, Systematic or accumulation errors for t Reciprocal leveling, Determine Contour Interval and Contour Line Values, determine level of the sewer, and computation of area (regular and irregular figures) by using diffe methods.

9. Teaching and Learning Strategies

Strategy	Learning and teaching strategies in surveying will be designed to engage students in the subject matter while equipping them with the necessary knowledge and skills. These will be encouraged

	students to participate in the learning process through activities that require them to apply their knowledge. This can be accomplished through problem-solving exercises, case studies, and fieldwork. Also, encourage students to work in groups to solve problems and complete projects. This approach promotes teamwork, communication, and critical thinking skills. Fieldwork will be Provided opportunities for students to engage in real-world surveying activities. This could involve conducting surveys, collecting data, and analyzing the results in the field.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	To understand different types of survey.(i)	Introduction - Surveying by tape	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
2	5	Learn the Methods of locating a point or the types of coordinates (i).	Methods of locating a point or the types of coordinates,	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	Quiz No.1
3	5	To understand plane surveying instruments such as: tapes.(i). Learn how to correct errors due to temperature, Pull, Sag, and slope(iii).	Systematic or accumulation errors	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
4	5	Learn how to correct errors due to temperature, Pull, Sag, and slope.(iii)	Systematic or accumula errors: Correction for Correction for pull or tension	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	HW
5	5	To learn how to draw a straight line and measure its distance using a tape measure in the presence of obstacles and choosing the appropriate method(iii).	Obstacles	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
6	5	To understand plane surveying instruments such as levels(i).	Levelling, Projection building	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
7	5		Mid-term Exam		Mid-term Exam
8	5	Learn how to calculate elevations (R.L) based on	Procedure in levelling, Rise and fall method,	Lectures on theory	

		a staff reading by Rise and fall method (i) .		conducted in the classroom. A practical lecture conducted in the laboratory.	
9	5	Learn how to calculate elevations (R.L) based on a staff reading by Height of collimation method(i) .	Height of collimat method	Theoretical lectures in class and A lecture in the lab.	
10	5	Learn how to calculate elevations (R.L) based on a staff reading by Height of collimation method(iii)	Cross-sections,	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	Quiz No.2
11	5	Contour mapping using different methods and choosing the appropriate method(iii).	contouring, Gridding (The methods of squar Radiating lines, Di contouring	Lectures on theory conducted in the classroom.	
12	5	Correcting elevations in different cases due to the curvature of the land or Refraction(i).	Reciprocal leveling,	A practical lecture conducted in the laboratory.	
13	5	Correcting elevations in different cases due to the curvature of the land or Refraction(i). To determine the level of the sewer(iii)	Curvature and Refracti Sewer	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
14	5	To determine the level of the sewer (iii)	Sewer	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
15	5	To calculate areas using different methods and choosing the appropriate method(iii).	Areas , Mechanical integrati the planimeter, Areas encl by straight lines , and Irreg figures	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
16	3		**Preparatory week before final Exam**		**final Exam**

11. Course Evaluation

Evaluation type	**Degree**
2 quizzes	10
1 homework	10
classwork	20
Term exam	15

Final exam	50
Total	100
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Surveying (A.Bannister & S.Raymond)
Main references (sources)	Surveying by (S.K.Hussin and M.SNagaraj)
Recommended books and references (scientific journals, reports…)	-------
Electronic References, Websites	

Course Description Form

1. Course Name:	
Computer II	
2. Course Code:	
UOM 2032	
3. Semester / Year:	
Second / 2025−2026	
4. Description Preparation Date:	
1/9/2025	
5. Available Attendance Forms:	
Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
3 hours/ 3 credits	
7. Course administrator's name (mention all, if more than one name)	
Name:. Omar Kanaan Alsultan , Email: omar.alsultan@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	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 use two of Microsoft Office applications (Word and Excel). Students successfully completing this course will be able to: 1. Identify and discuss the hardware components of the computer system. 2. Create documents using a word processor and create presentations. 3. Conduct research on the Internet. 4. Gain an introduction to Artificial Intelligence.
9. Teaching and Learning Strategies	
Strategy	The basic strategy for delivering this module will focus on encouraging students' engagement in practical activities while simultaneously enhancing and expanding their critical thinking skills. This will be achieved by combining lectures, laboratory sessions and engaging students in external research on topics in computer technology that interest them.

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	3	**Security and Networking:** What is a network? Types of networks. Basic network components.	Network Security Basics. Understanding network threats. Network Troubleshooting	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
2	3	**E-Commerce:**	Concepts of Electronic banking services this include online banking: ATM and debit card services, Phone banking, SMS banking, electronic alert, Mobile banking.	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	Quiz No.1
3	3	**Computer Troubleshooting:** Identifying and solving common hardware and software problems that computer users encounter,	Basic troubleshooting techniques and tools for diagnosing and resolving issues.	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
4	3	**Computer Troubleshooting:** Identifying and solving common hardware and software problems that computer users encounter,	Basic troubleshooting techniques and tools for diagnosing and resolving issues.	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	HW
5	3	**Introduction to AI:**	Definition of AI, History of AI, AI Techniques and Approaches, Challenges an Ethical Considerations.	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
6	3	**Introduction to AI:**	Definition of AI, History of AI, AI Techniques and Approaches, Challenges an Ethical Considerations.	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
7	3	**AI in Our Daily Lives:**	AI in smartphones and virtu assistants like Siri or Googl Assistant.)	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
8	3	**AI in Our Daily Lives:**	AI in smartphones and virtu assistants like Siri or Googl Assistant.)		Mid-term Exam

9	3	**Applications of AI:**	Education, Healthcare, Finance, Transportation, Marketing and Advertising.	Theoretical lectures in class and A lecture in the lab.	
10	3	**Applications of AI:**.	Education, Healthcare, Finance, Transportation, Marketing and Advertising	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	Quiz No.2
11	3	**Applications of AI:**	Education, Healthcare, Finance, Transportation, Marketing and Advertising.	Lectures on theory conducted in the classroom.	
12	3	**AI and Society:**	(How Al affects social, Al a international relations, Al a the future of humanity.)	A practical lecture conducted in the laboratory.	
13	3	**Ethical Challenges in AI:**	**(AI ethics, privacy and surveillance, the impact o on the job market.)**	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	H.W
14	3	**The Future of AI :**	**(Future trends in Al, rece research and emerging technologies.)**	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
15	3	**Preparatory week before the final Exam**		Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
16	3		**Preparatory week before final Exam**		**final Exam**

11. Course Evaluation

Evaluation type	Degree
Quizzes	7.5
Assignments	7.5
Lab.	10
Report	10
Midterm Exam	10
Final Exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Graham Brown, David Watson, "Cambridge IGCSE Information and Communication Technology", 3rd Edition (2020)
Main references (sources)	
Recommended books and references (scientific journals, reports…)	2. Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology in Action Complete",16th Edition (2020). 3. Ahmed Banafa, "Introduction to Artificial Intelligence (AI)", 1st Edition (2024). 4 2016 الخضر على الخضر بحاث " أساسيات الحاسوب 5 2005 الدكتور عادل عبد النور, "مدخل إلى عالم الذكاء الاصطناعي "
Electronic References, Websites	

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Course Description Form

1. Course Name:	
Building construction	
2. Course Code:	
DWRE 216	
3. Semester / Year:	
1/2025-2026	
4. Description Preparation Date:	
1/9/2025	
5. Available Attendance Forms:	
Theoretical lectures 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:Noor Adrees Khattab Email: n.kattab@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	**Brick and block works, Properties of fresh concrete, Stone works, Brick tests, Formwork and scaffolding, Test compressive strength of concrete, lintels, beams and columns, Block test, Floors and ceilings, Tiles tests, Steel reinforcement bars tests, Moisture blocker works.**
9. Teaching and Learning Strategies	
Strategy	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 some challenging problems to motivate students. - Brick and block works. (i) - Stone works. (i) - Formworks and scaffolding. (i) - Lintels, beams and columns. (ii) - Floors and ceilings. (ii) - Moisture blocker works. (ii)

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Introduction; syllabus; Brick and block works.. (i)	Introduction; syllabus; Brick and block works	Theoretical lectures in class	Exam
2-3	4	Learn Brick and block works, Brick test. (i)	Brick and block works, Brick test	Theoretical lectures in class	HW & Exam
4-5	4	Learn about the reclamation of Introduction, Stone works. (i)	Introduction, Stone works	Theoretical lectures in class	HW & Exam
6	2	Learn the Stone works, Properties of fresh concrete. (ii)	Stone works, Properties of fresh concrete	Theoretical lectures in class	HW & Exam
7-8	4	Studying the Formworks and scaffolding. (ii)	Formworks and scaffolding	Theoretical lectures in class	HW & Exam
9	2	Identifying the Lintels, beams and columns, Block test, Tiles tests. (i)	Lintels, beams and columns, Block test, Tiles tests	Theoretical lectures in class	HW & Exam
10	2	Learn the the Lintels, beams and columns, Block test, Tiles tests. (ii)	the Lintels, beams and columns, Block test, Tiles tests	Theoretical lectures in class	HW & Exam
11-13	6	Designing Floors and ceilings, Moisture blocker works, Steel reinforcement bars tests.. (ii)	Floors and ceilings, Moisture blocker works, Steel reinforcement bars tests.	Theoretical lectures in class	HW & Exam
14	2	Identifying Floors and ceilings, Moisture blocker works, Steel reinforcement bars tests. (ii)	Floors and ceilings, Moisture blocker works, Steel reinforcement bars tests	Theoretical lectures in class	HW & Exam
15	2	Learn Floors and ceilings, Moisture blocker works, Steel reinforcement bars tests. (ii) (i)	Floors and ceilings, Moisture blocker works, Steel reinforcement bars tests	Theoretical lectures in class	Exam

11. Course Evaluation	
Evaluation type	**Degree**
3 Term exam	30
Midterm exam	20
Final exam	50
Total	100
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	• o Construction of buildings, by Zuhair Saku and Artin Levon.
Main references (sources)	• o Test of materials, by Yousif Al Duaf. • o Concrete mixtures, written by Dr. Ibrahim Ali Al Darwish, Dr. Abdul Wahab Awad. • o Concrete Mix Design • o Appendix issued by the Laboratory of testing of construction materials including • Details and vocabulary for the testing of construction materials. • o ACI code.
Recommended books and references (scientific journals, reports…)	----------
Electronic References, Websites	----------

1. اسم المقرر:
اللغة العربية 2 / Arabic Language2
2. رمز المقرر:
UOM 2012
3. الفصل / السنة:
الاول/ 2026-2025
4. تاريخ إعداد هذا الوصف
1/9/2025
5. أشكال الحضور المتاحة :
حضورياً
6. عدد الساعات الدراسية (الكلي)/ عدد الوحدات (الكلي):
عدد الساعات النظري (30)/ عدد الوحدات (2)
7. اسم مسؤول المقرر الدراسي (اذا اكثر من اسم يذكر)
المدرس : م.د ايناس عطوان سليمان
8. اهداف المقرر

- التعرف على أساسيات قواعد اللغة العربية
- اكســاب الطالب المهارة في الكتابة العربية من تصــحيح الأخطاء الواردة في الكتابة ومعرفة القواعد النحوية والاملائية التي تصــون اللسان عن الخطأ
- أن يفهم الطالب مدى أهمية اللغة العربية وقواعدها في الدراسات الانسانية وفي كتابة البحوث والتقارير
- تنمية القدرة لدى المتعلم على التحدث باللغة العربية، ما أمك
- تزويد المتعلم بالمادة اللغوية والمفاهيم الفكرية والمعارف الاملائية والنحوية والدلالية بحيث يتمكن بها من فهم واستيعاب النصوص وتطبيقها على أساليب الكلام
- تمكين الطالب من القراءة الصحيحة.

9. استراتيجيات التعليم والتعلم

- الكتاب المنهجي.
- الحلقات النقاشية
- خلق محاضرة تفاعلية بين الطالب والأستاذ في عرض المادة
- استعمال البور بوينت في توضيح موضوعات الدرس.
- تكليف الطالب ببعض الأنشطة والواجبا ت.

10. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة / أو الموضوع	طريقة التعليم	طريقة التقييم
1	2	A1 : أن يعرف الطالب الكلمة ثم يذكراقسامها (الأسم– والفعل – والحرف)	اللغة العربية /اقسام الكلمة وتعريفاتها	محاضرات وتقارير	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
2	2	A4 : أ يفرق الطالب بين همزتين القطع والوصل في الفظ والكتابة	النطق بهمزة القطع والوصل	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
3	2	A5 : أن يميز الطالب في كتابة القواعد الاساسية لكتابة الهمزة بالشكل الصحيح	قواعد كتابة الهمزة	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة،
4	2	A4 : أن يفرق الطالب في كتابة التاء المربوطة والتاء المفتوحة في اخر الاسماء	كتابة التاء في اخر الكلمة	محاضرات	واجب بيتي
5	2	B6 : أن يبحث الطالب في المعاجم عن الخطوات التي يجب اتباعها عند الحاجة لمعرفة معنى كلمة ما	طريقة الكشف عن الكلمات في المعاجم العربية	محاضرات	الامتحانات اليومية، الواجبات،

					النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
6	2	A5 : ان يميز الطالب ويبين الفرق بين المبني والمعرب وعلامات الأعراب الأصلية والفرعية	المبني والمعرب وعلامات الاعراب الاصلية والفرعية	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
7	2	A2 :ان يفهم الطالب الجزئين الرئيسين للجملة الاسمية وهما المبتدء والخبر	الجملة الأسمية	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
8	2	C1 : ان يوضح للطالب اهم الاختلافات بين افعال المقاربة والرجاء وعملها للجملة الاسمية	افعال المقاربة والرجاء والشروع	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
9	2	A5 : ان يميز الطالب بين الاعداد المعربة والاعداد المبنية ويميز كذلك بين العرفة والنكره	احكام العدد من حيث الاعراب والبناء ومن حيث التعريف والتنكير	حل تمارين	اختبار شفهي
10	2	A1 : ان يعرف الطالب اهمية علامات الترقيم في الكتابة	علامات الترقيم	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
11	2	B2 : ان يظهر الفرق بين الاخطاء الاملائية والاخطاء اللغوية في الكتابة	الأخطاء اللغوية	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل
12	2	A2 : أن يشرح الطالب الافعال الناقصة والتغير الذي يحدث على الجملة الاسمية بدخولها عليها	الافعال الناقصة	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
13	2	C7: ان يبين الفرق بالنطق بين حرفين الضاد والظاء	النطق كتابة الضاد والظاء	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
14	2	A2 : ان يصنف الطالب الفرق بين المنقوص والمقصور والممدود	التغاير الصرفي	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب

15	2	B8 : يكتب نبذه عن عناصر الشعر	الشعر وانواعه	محاضرات	واجب بيتي

11. تقييم المقرر
الحضور 1% الواجبات 4% اختبارات قصيرة (Quiz) 5% (الاسبوع الثالث، الاسبوع الخامس، الاسبوع السابع، الاسبوع التاسع، الاسبوع الحادي عشر) امتحان فصلي اول 15% (الاسبوع السادس) امتحان فصلي ثاني 15% (الاسبوع الرابع عشر) درجة السعي 40% الامتحان نهائي 60 % الدرجة النهائية 100%

12. مصادر التعلم والتدريس	
الكتب المقررة المطلوبة (المنهجية أن وجدت)	النحو الوافي – عباس حسن
المراجع الرئيسة (المصادر)	كتاب النحو المبسط ,للشيخ ادهم العاسمي
الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)	لايوجد
المراجع الإلكترونية، مواقع الانترنيت	لايوجد

Course Description Form

1. Course Name:	
Differential Equations	
2. Course Code:	
DWRE 221	
3. Semester / Year:	
Second / 2025-2026	
4. Description Preparation Date:	
1/9/2025	
5. Available Attendance Forms:	
Lectures on theory and tutorial conducted in the classroom.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
4 hours/ 2 credits	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Muhanad Talal , Email: mohanad_alsheer@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	To introduce students to the concept of differential equations and their significance in engineering and scientific applications. To provide students with the necessary skills to solve first order differential equations using separation

	of variables, and to classify them as homogeneous, non-homogeneous, exact and non-exact D.E's. To teach students how to solve linear and non-linear first order differential equations, as well as higher order differential equations. To familiarize students with the solution of second and higher order linear differential equations, with both constant and variable coefficients, and to teach them how to apply the variation of parameters method.

9. Teaching and Learning Strategies

Strategy	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.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Understanding of the fundamental concepts of Differential Equation	Defintion, Forming,Order and Degree of Differential Equation	A lecture in class	
2	4	Used Differential Equation to solution first order D.E by .Separation	Solution of the first order D.E.Separation of variables	A lecture in class	H.W
3	4	Used Differential Equation to solution first order D.E by . Homogeneous and exact	Homogeneous, non-homogeneous Exact and not exact D.E	A lecture in class	
4	4	Used Differential Equation to solution first order D.E by .linear	Linear and nonlinear first o D.E	A lecture in class	Exam
5	4	Used three methods solution First order higher degree D.E	First order and higher degree D.E	A lecture in class	H.W
6-10	16	Used methods to solution equations	Solution of second and higher order linear D.E & Solution of second and higher order linear D.E v constant coefficient		H.W, C.W and Exam
10-13	16	Used methods to solution equations	Physical and engineering application on order & Physical engineering application on order D		H.W, C.W and Exam
13-15		Understanding of the fundamental	Laplace Transform		

		concepts of Laplace Transform			
16	3		**Preparatory week before final Exam**		**final Exam**

11. Course Evaluation

Evaluation type	**Degree**
Quizzes / 3	24
Assignments / 5	10
Report	3
seminars	3
Midterm Exam	10
Final exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Theory and Problems of Differential Equations
Main references (sources)	By Frank Ayres, JR,PhD Advanced Engineering Mathematics By Dass
Recommended books and references (scientific journals, reports…)	-------
Electronic References, Websites	

Course Description Form

1. Course Name:
Fluid Mechanics II
2. Course Code:
DWRE 222
3. Semester / Year:
Second 2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Lectures and Tutorials
6. Number of Credit Hours (Total) / Number of Units (Total)
5 hr/5 cridits
7. Course administrator's name (mention all, if more than one name)
Name: Azza Nasralla Jaralla Al-Talib Email: a.altalib@uomosul.edu.iq

8. Course Objectives

Course Objectives	• **Inform students about the kinematics of flow motion** • **learn continuity equation and conversation of mass principle** • **learn Bernoulli equation for incompressible fluid and conversation of energy principle** • **learn the working principles of pumps and turbines and their applications** • **learn the working principles of Venturi meter and applications** • **learn the working principles of orifice meter and applications** • **learn the working principles of pitot tube and applications** • **learn impulse–momentum equation and applications**

9. Teaching and Learning Strategies

Strategy	The strategy is to provide theoretical lectures using presentations and video also question solving interactively with students inside the classroom, as well as tutorial exercises.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Learn the Kinematics of fluid motion	Kinematics of fluid motion	presentation	Monthly exam
2	4	learn continuity equation and conversation of mass principle	continuity equation and conversation of mass principle with applications	Presentation And white board	Monthly exam
4&3	6	learn Bernoulli equation for incompressible fluid and conversation of energy principle	Bernoulli equation for incompressible fluid and conversation of energy principle	Presentation And white board	Monthly exam
4	2	exam			
5&6	8	Learn working principles of pumps and turbines and their applications	Pumps and turbines in Bernoulli equation	Presentation And white board	Monthly Exam
7&8	6	Learn working principles of Venturi	Venturi meter	Presentation And white	Monthly Exam

		meter and applications		board	
8	2	exam			
9&10	8	Learn working principles of orifice meter and applications	orifice meter	Presentation And white board	Monthly Exam
11&12	8	Learn working principles of pitot tube and applications	pitot tube	Presentation And white board	Monthly Exam
13-14 &15	10	Learn impulse-momentum equation and applications	impulse-momentum equation	Presentation And white board	Monthly Exam
15	2	exam			

Laboratory Experiments:

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Learn how to write the Report	Writing report	presentation	Experimental reports
2,3,4	6	Bernoulli's equation	Proof Bernoulli's equation	Laboratory experiments	Experimental Reports
4,6,7	6	Learn Discharge Measurements in Pipes by Vanturi Meter	Discharge Measurements in Pipes by Vanturi Mete	Laboratory experiments	Experimental reports
8,9,10	6	Calculate Friction Factor in Pipes	Friction Factor in Pipes	Laboratory experiments	Experimental reports
11,12 ,13	6	Learn Discharge Measurement in Open Channel by Weirs	Discharge Measurement Channel by Weirs	Laboratory experiments	Experimental reports
14&15	4	Final lab exam			

11. Course Evaluation

Evaluation type	degree
2 Quizzes	10
2 h.w.	10
lab	20
Mid exam	10
Final exam	50
total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Elementary fluid mechanics By: Vinnard 6th ed. 1981
Main references (sources)	Fluid mechanic and Hydraulic machines By: Bansal 9th ed. 2010
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://uclouvain.be/en-cours-2023-lbres2104

Course Description Form

1. Course Name:
Structures
2. Course Code:
DWRE223
3. Semester / Year:
Spring 2025−2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Theoretical lectures in class
6. Number of Credit Hours (Total) / Number of Units (Total)
6 / 5
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Saddam M. AHMED Email: ahmed.saddam@uomosul.edu.iq Assistant Instructor: Dr. Mohammed M. Khalaf
8. Course Objectives

Course Objectives	In DWRE 223, initially students will learn how to analysis and assess the Internal strength and deformation for systems. Upon successful completion of this course the student shall be able to assess the: - Evaluate stability and determinacy of structures. - Analyze statically determinate structures and gates. - Evaluate elastic deformation using integration and conjugate beam methods. - Analyze indeterminate beams, frames, and trusses (first degree of indeterminacy). - Analyze indeterminate frames (multiple degrees) using moment distribution method. - Use computer software to analyze different types of structures.

9. Teaching and Learning Strategies

Strategy	PowerPoint presentations and multimedia tools are used in classrooms. Examples and problems are solved on the board during lectures. Tutorial sessions are held to enhance student engagement. Students are encouraged to research topics online, including similar course materials from other universities. MS Excel is used for project preparation. Students can access solved problems, spreadsheets, past exams, and more on the course website. The instructor answers content-related questions via official university email. Technical questions should be discussed during tutorial hours, office hours, or by appointment. Emails must be sent from official university accounts; others will not receive a reply.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	i	Introduction to structural types, basic principles, units, numerical computation, rigid body equilibrium, basic structural analysis	Lectures	Ass 1
2	5	i	Structural stability and determinacy, analysis of statically determinate structures	Lectures	HW1
3 & 4	10	i	Analysis of statically determinate structures, drawing shear force and bending moment diagrams	Lectures	Ass 2
5	5	i	Analysis of statically determinate trusses using joint and section methods	Lectures	Quiz 1, HW2
6	5	i	Elastic slope and deflection of beams using integration method	Lectures	Report1
7	5	i	Elastic slope and deflection of beams using conjugate beam method	Lectures	Ass3
8 & 9	10	i	Elastic slope and deflection of frames	Lectures	Quiz 2, HW3
10	5	i	Analysis of indeterminate frames using least work method	Lectures	Report 2
11	5	i	Analysis of indeterminate trusses using least work method	Lectures	Ass4
12 & 13	10	i	Analysis of indeterminate frames using moment distribution method	Lectures	HW4
14	5	i	Analysis of indeterminate structures (frames, trusses, gates) using software	Lectures	Project

11. Course Evaluation

Evaluation type	Degree
Two Quizzes (3 pts each)	7 pts
Midterm Exam	14 pts
Homework (each 2 pts)	8 pts
Assignments (each 2 pts)	8 pts
Two Reports (3 pts each)	6 pts
Project	7 pts
Final Exam	50 pts
Total	100 pts

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	R C., HIBBELER (**2011**) "Mechanics of Materials", eight Edition, PEARSON, ISBN 13: 978-0-13-602230-5, USA. (can be downloaded from the Course web page).
Main references (sources)	Elementary Theory of Structures by Yuan-Yu Hsieh, Prentice-Hall, 1980
Recommended books and references (scientific journals, reports…)	----------
Electronic References, Websites	----------

Course Description Form

1. Course Name:	
Areas and Volumes	
2. Course Code:	
DWRE 224	
3. Semester / Year:	
Second / 2025-2026	
4. Description Preparation Date:	
1/9/2025	
5. Available Attendance Forms:	
Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
6. Number of Credit Hours (Total) / Number of Units (Total)	
5hours/ 4credits	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Omar Muqdad Abdulgany, Email: o.agha@uomosul.edu.iq Name: Alaa Ismael Nasar, Email: engalaaismail79@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	Surveying II aims to teach students how to calculate the earthworks and reservoir volu from contour maps, bearing of lines, designation of bearing, theodolite, construction adjustment of the theodolite, measurement of angles, traverse surveys and their adjustm tachometer, and total station.

9. Teaching and Learning Strategies

Strategy	Learning and teaching strategies in surveying will be designed to engage students in the subject matter while equipping them with the necessary knowledge and skills. These will be encouraged students to participate in the learning process through activities that require them to apply their knowledge. This can be accomplished through problem-solving exercises, case studies, and fieldwork. Also, encourage students to work in groups to solve problems and complete projects. This approach promotes teamwork, communication, and critical thinking skills. Fieldwork will be Provided opportunities for students to engage in real-world surveying activities. This could involve conducting surveys, collecting data, and analyzing the results in the field.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	To calculate areas using different methods(i)	Introduction, Irregular figures, Give and take lines, Counting squares.	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
2	5	To calculate areas using different methods(i). and choosing the appropriate method(iii).	Counting squares, Trapezoidal Rule, Simpson Rule (for odd number),	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	Quiz No.1
3	5	To calculate volumes using different methods(i) and choose the appropriate method for calculating earthwork volumes (iii)	Volumes Earthwork calculation, Volumes from cross-sections, Sections level a cross (one level section), Sections with a cross fall (two level section).	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
4	5	To calculate volumes using different methods(i) and choose the appropriate method for calculating earthwork volumes (iii)	Sections part in cut and pa fill, Section of variable lev three level section), Multi-l section	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	HW
5	5	To calculate volumes using different methods(i) and choose the appropriate method for calculating earthwork volumes (iii)	Computation of volumes, m areas, end areas, Prismo formula.	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
6	5	To calculate volumes using the volume of a pyramid, and the Volume of wedge.	The volume of a pyran The Volume of wedge.	Lectures on theory conducted in the classroom. A practical lecture	

				conducted in the laboratory.	
7	5	To calculate volumes using Simpson's , spot levels (i) and choose the appropriate method for calculating earthwork volumes (iii)	Simpson's Rule Volumes, Volumes from levels or (volume of Borr Volume from contour lines	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
8	5	To use plane surveying instruments such as: Theodolite.	Mid-term Exam, Beari Designation of Bearing		Mid-term Exam
9	5	Learn how to calculate back bearing from angles(i) .	Deflection angle, Fore Back Bearings. Calculatio bearings from angles,	Theoretical lectures in class and A lecture in the lab.	
10	5	Learn how to calculate deflection angles from included angles(i)	Calculation of deflection an from included angles, No.2	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	Quiz No.2
11	5	To use plane surveying instruments such as: Theodolite.(i).	The theodolite and trav surveying, Trav computations, Latitudes departure.	Lectures on theory conducted in the classroom.	
12	5	Correcting angles and lengths of sides using various methods (iii).	Closing error, Graph adjustment, bowditch's r Transit rule, Distribution of angular error	A practical lecture conducted in the laboratory.	
13	5	To use plane surveying instruments such as: Tachometry (iii)	Tachometry, Optical princip Determine the stadia inte factor	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	H.W
14	5	To determine the distance using Tachometry and to use plane surveying instruments such as: Total station (iii)	Tachometry, Optical princi , Total station	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
15	5	to use plane surveying instruments such as: Total station (iii)	Total station	Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.	
16	3		**Preparatory week before final Exam**		**final Exam**

11. Course Evaluation

Evaluation type	**Degree**

2 quizzes	7.5
2 homework	7.5
classwork	20
Term exam	15
Final exam	50
Total	100
12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Surveying (A.Bannister & S.Raymond)
Main references (sources)	Surveying by (S.K.Hussin and M.SNagaraj) المساحة الهندسية - تأليف الدكتور ناجي توفيق
Recommended books and references (scientific journals, reports…)	-------
Electronic References, Websites	

Course Description Form

1. Course Name:
Physics and Soil Science
2. Course Code:
DWRE 225
3. Semester / Year:
Second / 2025-2026
4. Description Preparation Date:
1/09/2025
5. Available Attendance Forms:
Lectures on theory conducted in the classroom. A practical lecture conducted in the laboratory.
6. Number of Credit Hours (Total) / Number of Units (Total)
6 hours/ 6 credits
7. Course administrator's name (mention all, if more than one name)
Name: Mohammad Tarik Mahmood, Email: m.altaiee@uomosul.edu.iq Dr. Abdulazeez Abdulbasit Mohamed abdulazeez.mohammed@uomosul.edu.iq Abdulghani khalaf mohammed, alrobaai1982@uomosul.edu.iq
8. Course Objectives

Course Objectives	Enabling the student to become familiar with the physical properties of soil. Defining the requests with the mathematical relationships of the block. Introducing students to the properties of green onions in soil. Enable students to know and measure water flow in the soil. Training students to know and measure the permeability and hydraulic conductivity of soil. Giving the student sufficient information regarding the general equations of flow Providing the necessary information to the student according to his specialization in w resources.

9. Teaching and Learning Strategies

Strategy	1. Introducing the student to the importance of soil physics and its impact on calculating water consumption and water management 2. Enabling the graduate to learn about the basic issues in design and management of irrigation projects, In the future. This is done by giving theoretical lectures directly to the students and discussing the solutions with the students, Mathematical questions related to the subject also ask students to prepare scientific reports related to the subject, Study and presentation of educational slides related to soil physics and modern methods used in this field, Conducting some scientific visits to natural sites containing the targeted physical phenomena.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	6	Introducing the student to the ABCs of soil physics	Introduction to soil physic		
2	6	Introducing the student to the basic properties of soil physics	Soil physical properties	A lecture	
3	6	Introducing the student to the mathematical relationships of volume and mass	Volume and mass relationships	A lecture	
4	6	Introducing the student to the most important methods of measuring water flow in the soil.	Water flow throw soil	A lecture	Quizze1
5	6	Introducing the student to methods for measuring soil moisture content	Soil water content	A lecture	
6	6	Introducing the student to how to calculate potentials in the soil	Soil water potential	A lecture	
7	6	Introducing the student to how to calculate the soil moisture curve	Characteristic soil characteristic curve	A lecture	
8	6	Introducing the student to how to measure water flow to saturated soil	Water flow in saturated so	A lecture	Asign.
9	6	Introducing the student to Darcy's law	Darcy's law	A lecture	Quizze2
10	6	Introducing the student to calculating the hydraulic conductivity and permeability of soil	Hydraulic conductivity an permeability	A lecture	
11	6	Introducing students to calculating water flow in unsaturated soil	Water flow in unsaturated soil	A lecture	

12	6	Introducing students to methods of using general equations of flow	General equations of flow	A lecture	HW
13	6	Introducing the student to surface tension and its practical applications	Surface tension	A lecture	Mid Exam
14	6	Introducing the student to shear stress and methods of measuring it	Shear stress	A lecture	
15	6	Introducing the student to soil sorptivity and methods for measuring it	Soil sorptivity	A lecture	
16	3		**Preparatory week before final Exam**		**final Exam**

11. Course Evaluation

Evaluation type	**Degree**
2 quizzes	5
1 homework	10
classwork	20
Term exam	10
Final exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	1– Applied soil physics R.J.Hanks & G.L.Ashcroft 2 – Soil physics Hisham M. Hassan
Main references (sources)	Fundamentals of Soil Physic(DANIEL HILLEL)
Recommended books and references (scientific journals, reports…)	Soil Physics and Hydrology
Electronic References, Websites	https://www.soils.org/discussion-boards/index.php?%2Fforum%2F82-soil-water-management-conservation%2F=

Course Description Form

1. Course Name:
English 2
2. Course Code:
UOM2022
3. Semester / Year:
Second / 2025−2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Lectures on theory conducted in the classroom.
6. Number of Credit Hours (Total) / Number of Units (Total)
2 hours/ 2 credits
7. Course administrator's name (mention all, if more than one name)

Name: Dr. Laith Al-Taie, Email: laith.altaie@uomosul.edu.iq

8. Course Objectives

Course Objectives	In UOM 2022, initially students will learn how to develop their abilities in reading and writing from academic point of view

9. Teaching and Learning Strategies

Strategy	Understand the fundamentals of academic reading and writing. The student will be able to learn different types of readings and how to write academically and in addition how to write practical English in their professional life.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Distinguish between dependent, Independent, and Integrated essays	Dependent essays	Lectures on theory conducted in the classroom.	
2	2	Distinguish between dependent, Independent, and Integrated essays	independent essays	Lectures on theory conducted in the classroom.	Quiz 1
3	2	Distinguish between dependent, Independent, and Integrated essays	Integrated essays	Lectures on theory conducted in the classroom.	HW1
4	2	Find the topic and the thesis statement of short essays	Topic of thesis	Lectures on theory conducted in the classroom.	
5	2	Find the topic and the thesis statement of short essays	Topic of short essays	Lectures on theory conducted in the classroom.	
6	2	Identify the main ideas from the introduction paragraph	Introductionary paragraphs	Lectures on theory conducted in the classroom.	
7	2	Identify the main ideas from the body paragraph	Paragraph body structure	Lectures on theory conducted in the classroom.	
8			Mid-term Exam		Mid-term Exam
9	2	Find the supporting details from the introduction paragraph	Class elaboration	Lectures on theory conducted in the classroom.	
10	2	Find the supporting details from the body paragraph	Urban planning	Lectures on theory conducted in the classroom.	Quiz No.2
11	2	Draw an outline to link the ideas, supporting details, and essay topic	Urban planning	Lectures on theory conducted in the classroom.	
12	2	Make notes in response to an essay question to create main ideas,	Supplement of main ideas	Lectures on theory conducted in the classroom.	

		supporting details, and thesis statement			
13	2	Write the introduction paragraph on basis of the thesis statement and main ideas	Gathering essay structure	Lectures on theory conducted in the classroom.	HW 2
14	2	Build the body paragraphs based on main ideas and supporting details	Structuring essays and paragraphs	Lectures on theory conducted in the classroom.	
15	2	Write the introduction paragraph based on the main ideas	Structuring essays and paragraphs	Lectures on theory conducted in the classroom.	
16	2		Preparatory week before the final Exam	Lectures on theory conducted in the classroom.	final Exam

11. Course Evaluation

Evaluation type	**Degree**
2 quizzes	10
2 homework	5
Project	5
Report	10
Midterm	20
Final exam	50
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Philpot, Sarah, and Lesley Curnick. 2011. New Headway Academic Skills: Reading, Writing, and Study Skills. Level 3, Student's Book. Oxford: Oxford University Press
Main references (sources)	Philpot, Sarah, and Lesley Curnick. 2011. New Headway Academic Skills: Reading, Writing, and Study Skills. Level 3, Student's Book. Oxford: Oxford University Press
Recommended books and references (scientific journals, reports…)	-------
Electronic References, Websites	https://docs.google.com/document/d/1RsRkpe13v-cdmfaUMILwYSsFypFvAjgxd-2z1mfS66E/edit?tab=t.0

2

1. Course Name:	
Baath crimes in Iraq	
2. Course Code:	
UOM 2050	
3. Semester/Year:	
2 / 2025-2026	
4. Description Preparation Date:	
1/9/2025	
5. Available Attendance Forms:	
Individual group	
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: Marwa mohammed ameen Email: marwa.ameen@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Educating students about the crimes committed by the Baath regime in Ir …… • Guiding students to familiarize themselves With crimes…… • Educating students about the seriousness of crimes……
9. Teaching and Learning Strategies	
Strategy	Through the prescribed book

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
First	2		The concept crimes and thei types	View Sfei minutes a contribution	Written lecture
second	2		Types of trinational crime	=	=
			Political crime Exam		
third	2		Sociai	=	=
fourth	2		Crime		
fifth	2		The crime of suppressing	=	=
sixth			the Shaaban uprising		
			psychologial	=	=
Seventh	2		crimes of the baath	=	=
Eighth	2		regime of disrupting Friday	=	=
Ninth	2		prayers	=	=

10th	2		Mass grave crimes Chemical attack on Haiabja	=	=
Eleven	2		Use of internationally	=	=
twelfth	2				
Thirteenth	2		Exam	=	=
Fourth	2		Environmental crimes of the baath regime in Iraq	=	=
Fifteenth	2		Incidents of cemeteries and genocide committed dy the Baathist regime in Iraq	=	=

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 1.The theoretical exam inside the hall

2.The daily exam

3.Numders of activities within the class

4.Question-answer and exam 5.Monthly exam…. etc	
12. Learning and Teaching Resources	
Required textbooks(curricular books, if any)	Course book
Main references (sources)	
Recommended books and references (scientific journals, reports)	
Electronic references, websites	

Third 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)							
UGIII	5	1	DWRE 311	Hydraulics	هيدروليك	English	2				3		3	78	47	125	5.00	C	
		2	DWRE 312	Surface Water Hydrology	هيدرولوجي المياه السطحية	Arabic	2		2		1		3	78	47	125	5.00	C	
		3	DWRE 313	Irrigation Principles and Practices	اسس الري و عملياته	Arabic	2			1	1		3	63	37	100	4.00	C	
		4	DWRE 314	Concrete Design	تصميم خرسانة	English	3			1	2		3	93	82	175	7.00	S	
		5	DWRE 315	Principles of Soil Mechanics	مبادئ ميكانيك التربة	English	2		3		2		3	108	67	175	7.00	C	
		6	DWRE 316	Statistical Methods in Hydrology	الطرق الاحصائية في الهيدرولوجي	English	2						3	33	17	50	2.00	S	
					Total Weekly Hours	29	13	0	5	2	9	0	18	453	297	750	30.00		

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)							
UGIII	6	1	DWRE 321	Numerical Analysis	التحليلات العددية	English	3				2		3	78	72	150	6.00	C	
		2	DWRE 322	Open Channels	القنوات المفتوحة	English	2				3		3	78	47	125	5.00	C	DWRE 311
		3	DWRE 323	Groundwater Hydrology	هيدرولوجي المياه الجوفية	Arabic	2		2		1		3	78	22	100	4.00	C	
		4	DWRE 324	Drainage Engineering	هندسة البزل	Arabic	2		1		2		3	78	72	150	6.00	C	
		5	DWRE 325	Soil Mechanics and Foundations	ميكانيك التربة والاسس	English	2		2		2		3	93	32	125	5.00	C	
		6	DWRE 326	Consumptive Use and Water Duty	الاستهلاك المائي و المقننات المائية	Arabic	2						3	33	17	50	2.00	C	
		7	DWRE 327	Engineering Project Design & Planning	تصميم وتخطيط المشروع الهندسي	Arabic	1			1			3	33	17	50	2.00	S	
					Total Weekly Hours	30	14	0	5	1	10	0	21	471	279	750	30.00		

Course Description Form

1. Course Name:
Hydraulics
2. Course Code:
DWRE 311
3. Semester / Year:
2025-2026
4. Description Preparation Date:
9/11/2025
5. Available Attendance Forms:
Lectures and Tutorials
6. Number of Credit Hours (Total) / Number of Units (Total)
4 hr/4 cridits
7. Course administrator's name (mention all, if more than one name)
Name: Prof. Ahmed Y. Mohammed; Email: a.altaee@uomosul.edu.iq Dr. Talal A. Basheer ; Email: t.basheer@uomosul.edu.iq
8. Course Objectives

Course Objective	On successful completion of this course students will be able to: 1. Recognize the common types of flow in pipes (i) 2. Apply the basic concepts of sciences and engineering to solve issues associated with the flow in pipes(i) 3. Formulate the main parameter to design a model related to flow of water (ii) 4. Develop and solve design problems and analyze the data to evaluate the pipes used in supply system (ii). 5. Identify and analyze the solution of a problem occurs in flow over a hydraulic structure (i)

9. Teaching and Learning Strategies

Strategy	The strategy is to provide theoretical lectures using presentatio and question solving in an interactive way with students inside the classroom, as well as tutorials exercises.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Recognize how to create a model (physical or numerical) and select the relevant variables.	Dimensionless analysis	Lecture in class	HW & Quiz
2	2	Understand the flow in pipes types and what are their appl	Modelling in pipes open channel	Lecture in class	HW & Quiz

3	2	Understand the flow in pipes types and what are their appl	Flow in pipes, gen equations	Lecture in class	HW & Quiz
4	2	Understand the flow in pipes types and what are their appl	Laminar and turbu flow in pipes	Lecture in class	HW & Quiz
5	2	Summarize what is meant by a s in pipes, friction force.	Distribution of velo shear stress in pipes	Lecture in class	HW & Quiz
6	2	Understand the flow in pipes and their types and what are their application.			
7	2	Understand the flow in pipes types and what are their appl	Flow in rough pipes	Lecture in class	HW & Quiz
8	2	Understand the flow in pipes types and what are their appl	Classification of ro smooth flow in pipe	Lecture in class	HW & Quiz
9	2	Discuss the usage of non-circula how to deal with them theore	Flow in non-circular pi	Lecture in class	HW & Quiz
10	2	Describe the different types added to the system of water	Minor losses of the fitt in orifice and sypho	Lecture in class	HW & Quiz
11	2	Define the connection between how to deal with them hydra term of parallel, series and b	Connect pipes in pa series	Lecture in class	HW & Quiz
12	2	Define the connection between how to deal with them hydra term of parallel, series and b	Branched channel, with tanks	Lecture in class	HW & Quiz
13	2	Identify the basic of designing th of water supply system.	Hardy- cross method t discharge in each networks	Lecture in class	HW & Quiz
14	2	Discuss the various properties ar pumps.	Pumps: introduction, c and efficiency	Lecture in class	HW & Quiz
15	2	Explain the connection of pu system.	Pumps in parallel and s	Lecture in class	HW & Quiz

11. Course Evaluation

Evaluation type	**degree**
First monthly exam	20
Second monthly exam	20
HW & Quiz	10
Final exam	50
total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Vennard, J.K., 1963. Elementary fluid mechanics. edition.
Main references (sources)	Rajput, R.K., 2004. *A textbook of fluid mechanics hydraulic machines*. S. Chand Publishing.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://uclouvain.be/en-cours-2023-lbres2104

Course Description Form

1. Course Name :
Surface water Hydrology
2. Course Code:
DWRE 312
3. Semester / Year:
first/ 2025−2026
4. Description Preparation Date:
1−1−2025
5. Available Attendance Forms:
Theoretical lectures in class
6. Number of Credit Hours (Total) / Number of Units (Total)
5/5
7. Course administrator's name (mention all, if more than one name)
Name Dr. Saleh Mohammed Saleh , Dr.Rasha M. Sami Fadhil Email: s.zakaria@uomosul.edu.iq , Rasha.fadhil@uomosul.edu.iq
8. Course Objectives

Course Objectives	• The aim of this course is to introduce the students to the area of hydrology. The course will cover the principles of the hydrology focusing on the introduction to the Hydrology, Climate Factors, Precipitation, Abstraction from Precipitation, Stream flow Measurement, Run-Off Hydrograph , and Flood Routing. At the end of the course the students will have good knowledge about the hydrologic events and have the skills to deal with a complete process and analysis of the hydrologic events. This will be achieved through descriptive lectures and supervised tutorials
9. Teaching and Learning Strategies	
Strategy	• The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises in addition lectures, individual & group assignments, and e-learning platforms, while at the same time refining and expanding their critical thinking skills. • Exercises involving the use of hydrological vocabulary and components to understand the engineering hydrological processes. The course will be taught in Arabic , and all mandatory assignments

	have to be submitted within the deadlines to be admitted to the exams. • This will be achieved through classes, interactive tutorials and by considering some challenging problems to motivate student

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Knowing the types and Nature of hydrological data and symbols to understand the engineering hydrological processes.	Introduction; syllabus; Definition of hydrology, branch of Hydrology, hydrological cycle, Hydrological Budge Equation ، Engineering Hydrology Application, Typical Failure Factors for Hydraulic Installations, Source of Data.	Theoretical lecture in class	HW
2 - 3	6	hydrological analysis using Climate Factors	Introduction, Climate Factors, Temperature, Solar Radiation, Evaporation, Humidity, Vapor Pressure, and Wind.	Theoretical lecture in class	HW
4-5	6	Estimating of Total solar energy gained, Total solar energy loss, reflection, and dispersion, Estimating Saturation Deficit, Relative Humidity, Wind Speed	Introduction of Precipitation , Forms of Precipitation, Rain, Snow, Drizzle, Glaze, Sleet, Hail, Measurement of precipitation, Types of rain gauge, Errors in rainfall measurement, Precipitation Gage Network, adequacy of rain measurement stations, Preperation of data, Methods for calculating missing information, Test for Consistency of Records,	Theoretical lectures in class	H W & Exam
6	3	Estimating of the Precipitation, (Arithmetic Mean Method, Thiessen Average Method, Isohyet Line Method).	Average Precipitation over Area, Arithmetic Mean Method, Thiessen Average Method, Isohyet Line Method, Rainfall Data-show Methods, Accumulated Rainfall, Hyetograph, Rainfall Intensity, Probable Maximum Precipitation, Point	Theoretical lectures in class	HW

			Rainfall, Depth- area-duration –Relationship, Depth-Area-Duration, Intensity –Duration – Return period relation.		
7-8	6	Knowing the Abstraction and losses from Precipitation from , and Knowing Types of evaporation meters, Class A. Estimating Empirical Evaporation Equations	Abstraction from Precipitation including precipitation, Evaporation, Evaporimeter, Types of evaporation meters, Class A Evaporation Pan, Pan Coefficien, Evaporation Measurement Stations, Empirical Evaporation Equations, Analytical methods for estimating, Types of evaporation meters, reducing evaporation from tanks.	Theoretical lectures in class	Quizzes & HW
9-10	6	Knowing and Estimating the Potential Evapotranspiration. Measurement of Infiltration, Infiltration Capacity Values, Estimating Infiltration Indices.	Evapotranspiration, Potential Evapotranspiration Equations, Infiltration, Measurement of Infiltration, Infiltration Capacity Values, Infiltration Indices	Theoretical lectures in class	HW1 HW2
11	3	Knowing the Water stage	Introduction, Stage or Water stage, time curve-Stage , Stream flow measurement, Measurement of velocity, Calibration, Equalization of the current meter device,	Theoretical lectures in class	Midterm Exam
12	3	Estimate Runoff	Rational Method SCS-CN Method	Theoretical lectures in class	Exam
13-14	6	Analysis Hydrological problems, Estimating Runoff Hydrograph	Hydrograph, Over land Flow or Surface Runoff, Inter Flow, Base Flow or Ground Water Flow, Hydrograph component, Factors affecting flood hydrograph, Direct Runoff or Surface Flow (D.R.O.), Base Flow (B.F.) , Base Flow Separation, Effective Rain, Unit Hydrograph, Unit Hydrograph Assumptions, Unit Hydrograph Derivation, Unit Hydrograph for Different Duration	Theoretical lectures in class	HW1 HW2

15	3	Applying the Routing method for hygrological storage and channel.	Flood Routing, Hydrologic Storage Routing, Hydrologic Channel Routing.	Theoretical lectures in class	HW

Laboratory Experiments:

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2		A general introduction to surface water hydrology programs, an ntroduction to the watershed modeling system, and its feed data.	Laboratory Computers	HW
2	2	DEM	DEM-Digital maps, creating a digital model of the study area	Laboratory Computers	HW
3	2	WMS software	Introduction to the hydrological models within the system. How to activate and operate the TR-20 hydrological model.	Laboratory Computers	HW
4	2	WMS software	WMS software - Introduction to hydrological models and how to activate and operate them.	Laboratory Computers	Exam
5	2		Theoretical and practical exam.	Laboratory Computers	Report
6	2	Excel software	Excel software - Introduction to Excel & Basic Navigation – Formatting Cells and Data Presentation	Laboratory Computers	HW
7	2	Excel software	Excel software - Formulas and Basic Functions	Laboratory Computers	HW
8	2	Excel software	Excel software - Advanced Functions and Data Validation	Laboratory Computers	Exam
9	2	Excel software	Excel software - Charts and Visual Data Representation	Laboratory Computers	HW
10	2	Excel software	Excel software - PivotTables and PivotCharts- Data Analysis Tools	Laboratory Computers	HW

11	2	Excel software	Excel software - Macros and Introduction to VBA	Laboratory Computers	HW
12	2	Excel software	Excel software - Solving Engineering Problems in Excel-1	Laboratory Computers	Report
13	2	Excel software	Excel software - Solving Surface Hydrology Problems in Excel-2 (Application Engineering Approach)	Laboratory Computers	HW
14	2		Theoretical and practical exam.	Laboratory Compute	Exam
15	2	Final Exam			

11. Course Evaluation

Evaluation type	**degree**
Class Work	5
Quiz	5
Monthly Exam	15
Lab	15
mid	10
Final Exam	50

12. Learning and Teaching Resources

Ward, Roy C., and Mark Robinson. Principles of hydrol Vol. 367. London: McGraw-Hill, 1975.	
Raghunath, H. M. (2006). Hydrology: principles, anal and design. New Age International.	

Course Description Form

1. Course Name:
Irrigation principles and practices
2. Course Code:
DWRE 313
3. Semester / Year:
Ferst Semester/2025−2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Theoretical lectures in class
6. Number of Credit Hours (Total) / Number of Units (Total)
4hour*15 week/4 units
7. Course administrator's name (mention all, if more than one name)
Dr. Anmar Abdulaziz AL-Talib anmar.altalib@uomosul.edu.iq Alaa ismail naser engalaaismail79@uomosul.edu.iq

8. Course Objectives	
Course Objectives	The course aims to introduce the student to the principles and foundations of irrigation, its operations, methods, and matters related to it

9. Teaching and Learning Strategies	
Strategy	The course Irrigation principles and practices teaches students many useful things in the future in designing and understanding the basic principles of irrigation. After completing this course, students are expected to be familiar with the following points: 1. Definition of irrigation, its purpose and benefits. 2. Identify and store irrigation sources. 3. Basic relationships between soil and water. 4. Safe drainage from groundwater reservoirs. 5. The feasibility of developing underground reservoirs and the changes that occur in them. 6. Learn about ground moisture measurements and how to calculate the amounts of water stored in the soil. 7. Identify the characteristics of water entering the soil.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Irrigation in the world - irrigation since ancient times - dry areas in the world - definition of irrigation -	Introducing the student to irrigation in general	Lecture	

		precipitation - flood water - ground water			
2-3	8	Fields of irrigation science - Irrigation economics - Falling on valleys – Water resource studies – Surveying operations in snowy areas and their benefits – Surface tanks	The future of growth and expansion in irrigation	Lecture	H.W(1) and Daily exam(1)
4-5	8	Small dams sedimentation (accumulation of sediments) in reservoirs - reduction of evaporation losses - problems of aquatic (aquatic plants) - industrial rain or sowing of clouds - development of river pumping Transferring saline water to fresh water - Importance of ground water (groundwater) - Feeding or recharging aquifers - Safe disposal of underground irrigation tanks	rrigation water sources and storage	Lecture	H.W(2)and Dailyexam(2)
6	4	Monthly exam(1)			
7-8	8	Soil and soil basic relationships - soil texture - soil structure (soil construction) - specific gravity (real	The basic relationships between soil and water	Lecture	H.W(3)and Daily exam(3)

		weight) - specific weight Pore space - leaching - soil water input - permeability - soil depth - plant food compounds - soluble excess salts			
9-10	8	Surface tension - Tensile stresses (tension compressors) - Soil moisture stress - Soil moisture content - Soil water classification and availability (availability) Fill the available ground water tank - the natural properties represented by the soil	The basic relationships between soil and water	lecture	H.W(4)
11	4	Monthly exam(2)			
12	4	Determination of moisture content of soil by weight method - Exploitation of electrical properties of porous mold - Tensometers - Neutron method for soil moisture measurement - Thermal properties - Error in sample	Measuring soil moisture	lecture	H.W(5)
13-14	8	Flow of water in and through soil - Energy in flowing water - Bases to measure pressure energies in saturated soil - Measuring soil permeability Characteristics of soil water input (absorption) - Constant pressure permeability meter - Variable pressure permeability meter - Input rate measurement (soil absorption of water) - Precipitation and movement of soil water during irrigation - Asymmetric and non-homogeneous soil in all directions .	The flow of water into and through the soil	lecture	H.W(6) and Daily exam(4)
15	4	Monthly exam(3)			

11. Course Evaluation

Evaluation type	**Degree**
Quizzes	10%
Home works	5%

Term exam	25%
Final exam	60%
Total	100%
12. Learning and Teaching Resources	
Required textbooks (curricular books any)	• Irrigation principles and practices , by V.E. Hansen ,O.W.Israelsenand G.F. Stringham, fourth edition, john wiley and sons., 1980.
Main references (sources)	• Crop water requirements (FAO – 24 • -Crop evapotranspiration –guide lines for computing crop water requirements (FAO –56) • Design manual for irrigation &drainage- ministry of irrigation-Iraq (pencol),1980
Recommended books and references (scientific journals, reports…)	----------
Electronic References, Websites	https://classroom.google.com/c/ODA3MzgwMDY4MjYw

Course Description Form

1. Course Name:	
Concrete Design	
2. Course Code:	
DWRE 314	
3. Semester / Year:	
1/2025−2026	
4. Description Preparation Date:	
19/10/2025	
5. Available Attendance Forms:	
Theoretical lectures 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: Ass. Prof. Dr. Saddam M. AHMED Email: ahmed.saddam@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	In DWRE 314, initially students will learn how to analysis and design reinforced concrete elements. Upon successful completion of this course the student shall be able to assess the: 1.Mechanical properties of concrete, and reinforcements, (ii) 2.Safety and serviceability provision, (ii) 3.Behavior of reinforced concrete at working and ultimate loads, (ii)

	4.Analysis and Design of simple beams and slabs by working stress method, (ii) 5.Analysis and Design of simple beams and slabs by ultimate strength design method, (ii) 6.Analysis and design of T beam, Doubly reinforced beam and continuous beams by Ultimate strength design method (USD), (ii) 7.Shear strength in beams and design of shear reinforcement, (ii) 8. Mechanical properties of Shear strength in beams and design of shear reinforcement, (ii) 9.Behavior of reinforced concrete columns, (ii) 10.Analysis and Design of short columns, (ii) 11.Analysis and Design of flat slab, (ii) 12.Analysis and design of flat slab with drop panels, (ii) 13.Analysis and design of Two-way slab and beams, (ii) 14.Procuration for seismic resistance moment frames, (ii) 15. Use computer software to Design and analysis different types of structures (ii).

9. Teaching and Learning Strategies

Strategy	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 some challenging problems to motivate students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	ii	Introduction; syllabus; Advantages and Disadvantages of Reinforced Concrete as a Structural Material; Mechanical properties of concrete; steel. Concrete and steel grading; design philosophy; Loading types.	Theoretical lectures in class	Exam1
1-2	2	ii	Introduction, Flexural Analysis of Beams (working): Cracking Moment; Elastic Stresses—Concrete Cracked	Theoretical lectures in class	H.W1
2-3	6	ii	Introduction, Flexural Analysis of Beams (Ultimate): Ultimate Moment; Yield Stresses	Theoretical lectures in class	Exam2
3-4	6	ii	Strength Analysis of Beams According to ACI Code: Design Methods; Strains in Flexural Members; Balanced Sections, Tension-Controlled Sections, and Compression-Controlled	Theoretical lectures in class	ClassW1
4-5	6	ii	Design of Rectangular Beams and One-Way Slabs: Load Factors; Design of Rectangular Beams; One-Way Slabs	Theoretical lectures in class	Exam3
5-6	6	ii	Analysis and Design of T Beams and Doubly Reinforced Beams: T Beams; Design of Doubly Reinforced Beams (positive and Negative Moment design); L-Shaped Beams	Theoretical lectures in class	H.W2
7	3	ii	Shear and Diagonal Tension: Shear Stresses in Concrete Beams; Design for Shear.	Theoretical lectures in class	ClassW2

7	3	ii	Introduction; syllabus; Advantages main and secondary reinforcements; steel and concrete shear resistance.	Theoretical lectures in class	Exam4
8	6	ii	Introduction to columns, Flexural Analysis of short columns (under axial loads), Load carrying capacity of short columns, ties design	Theoretical lectures in class	H.W3
9	6	ii	Short column under axial and bending actions, Interaction diagram (m-p curves).	Theoretical lectures in class	Exam5
10	6	ii	Design of short columns subjected to bending and axial loads according to ACI Code: Design Methods.	Theoretical lectures in class	ClassW3
11	6	ii	Design of flat slab: Load Factors, shear check	Theoretical lectures in class	Exam6
12	6	ii	Design of flat slab with drop panels.	Theoretical lectures in class	H.W4
13	6	ii	Design of Rectangular Beams and two-Way Slabs, Shear check.	Theoretical lectures in class	ClassW4
14	6	ii	Use computer software to Design and analysis different types of structures	Theoretical	Project

11. Course Evaluation

Evaluation type	**Degree**
Six Exams, (each 4pt)	24pt
Four H.W. (each 2pt)	8pt
Four ClassW (each 1pt)	4pt
Midterm Exam	10pt
Project	4 pt
Final Exam	50pt
Total	100pt

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Jack M., Russell B. (2012) "DESIGN OF REINFORCED CONCRETE", nine Edition, Wiley, ISBN: 978-1-118-12984-5, USA. (can be downloaded from the Course web page).
Main references (sources)	• Gillesania, D.I.T. "FUNDAMENTALS OF CONCRETE DESIGN". Phils. DIT Gillesania, 2003. (can be downloaded from the Course web page).
Recommended books and references (scientific journals, reports…)	----------
Electronic References, Websites	----------

Course Description Form

1. Course Name:
Principles of Soil Mechanics
2. Course Code:
DWRE315
3. Semester / Year:
Fall semester (first) / 2025 -2026
4. Description Preparation Date:
2025/10/15
5. Available Attendance Forms:
Class lectures + Lab. lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
7/105
7. Course administrator's name (mention all, if more than one name)
Name: Zuheir Karabash Email: karabash@uomosul.edu.iq

8. Course Objectives	
Course Objectives	The objective of the principle of soil mechanics course is to introduce the subject of geotechnical engineering. In this course, the student will understand and be familiar with important topics: type of the soils and their origins, index, and physical and engineering properties of soils, soil structure and grain size, classifications of soils for engineering purposes, permeability of the soil and seepage through the soil, soil stresses, compressibility, and consolidation. Upon completion of the principle of soil mechanics course, students should be able to apply principles of soil mechanics in the analysis, design, and construction of civil engineering projects. This course covers the GOs (i and iii)

9. Teaching and Learning Strategies	
Strategy	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 some challenging problems to motivate students.

10. Course Structure

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

1	7	Definition of the soil types and origin	Introduction, types of soil, soil origin, and formation.	Lecture in class	Class discussions
2	7	Explaining the physical properties of the soil	Physical properties of the soil, weight-volume relationships soil structures.	Lecture in class	Quiz
		Learn the soil water content and Gs determination	Lecture and Water content and GS tests	In Lab.	Report
3	7	Knowing the soil consistency and Atterberg's limits	Soil plasticity and Atterberg limits, clay mineralogy.	Lecture in class	Quiz
		Learn Atterberg's limits tests	Lecture, Atterberg's limits	In Lab.	Report
4	7	Learn the soil classification systems	Soil classification.	Lecture in class	Class discussions
		Learn how to estimate soil grain size distributions	Lecture and grain size distribution tests.	In Lab.	Report
5	7	Learn the permeability of the soil	Permeability of soils, Darcy's law, and soil coefficient of permeability.	Lecture in class	Course examination No.1
		Learn about the permeability tests	Lecture and permeability test	In Lab.	Report
6+7+8	7+7+7	Knowledge of seepage of water through soils	Seepage of the water through the earth dams.	Lecture in class	Quiz and Course Examination No.2
9+10	7+7	Knowledge stresses in the soil	Total and effective stresses and stresses due to external loads.	Lecture in class	Homework assignment
11+12+13 +14+15	7+7+7 +7+7	Knowing the consolidation theories and mechanisms	Consolidation, mechanism of consolidation, consolidation test, and data analysis, and presentation of consolidation test results.	Lecture in class	Quiz
		Learn the consolidation test	Lecture and consolidation test.	In Lab.	Report

11. Course Evaluation	
Evaluation type	**degree**
Homework, classwork, reports (6)	2
Quizzes (2)	5
Term exam (2)	28
Laboratory, experimental part	15
Final exam	50
Total	100

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	○ Al-Asho, M. O "Soil Mechanics Principles", 1990 Student textbook, University of Mosul.
Main references (sources)	○ - Das, B.M. and Sobhan, K. "Principle of Geotechnical Engineering", ninth Edition, Cengage Learning. ○ Coduto, D.P. " Geotechnical Engineering Principles and Practices", 1999, Prentice-Hall, Inc.
Recommended books and references (scientific journals, reports…)	1. Al-Rafidain Engineering Journal. 2. Highway Research Record, H R R. 3. Journal of the Geotechnical Engineering Division, ASCE. 4. Journal of Soil Mechanics and Foundation Division, Proc. ASCE. 5. Transportation Research Record, TRR. Journal of the Japan Society of C Engineering, JSCE.
Electronic References, Websites	None

Course Description Form

1. Course Name:
Statistical Methods in Hydrology
2. Course Code:
DWRE 316
3. Semester / Year:
First / 2025-2026
4. Description Preparation Date:
1/9/2023
5. Available Attendance Forms:
Theoretical lectures 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. Muhanad Talal Yousif Email: mohanad_alsheer@uomosul.edu.iq
8. Course Objectives

Course Objectives	• Analysis of hydrological data • Representation and graphical of hydrological data • Used the descriptive statistics for hydrological data • Understand the meaning of probability theory • Application the regression analysis and correlation on hydrological data
9. Teaching and Learning Strategies	
Strategy	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, by considering type of exercises involving some problems that are interesting to the students in

	mathematics scope in a field of dams and water resources engineering.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	6	Analysis of hydrological data	Introduction to statistical Hydrology; Definitions and Scope; Need of Statistical Methods; Hydrologic Processes; Hydrologic Variables	A lecture in class	H.W, C.W and Exam
4-6	6	Analysis of hydrological data, Representation and graphical of hydrological data	Graphical Representation Hydrologic Data; Dot Diagram; Histogram; Frequency Polygon	A lecture in class	H.W, C.W and Exam
7-9	6	Analysis of hydrological data, Representation and graphical of hydrological data	Cumulative Relative Frequency Diagram; Duration Curves; Bar Chart	A lecture in class	H.W, C.W and Exam
10-12	6	the descriptive statistics for hydrological data	Numerical Summaries and Descriptive Statistics; Measures of Central Tendency; Mean; Median; Mode; Measures of Dispersion; Mean Absolute Deviation; Standard Deviation and variance	A lecture in class	H.W, C.W and Exam
13-15	6	Application the regression analysis and correlation on hydrological data	Regression Analysis; Simple Linear Regression (SLR) and Curvilinear Regression; Model Transformable to Linear Regression, Correlation and Coefficient of Determination	A lecture in class	H.W, C.W and Exam

11. Course Evaluation

Evaluation type	**Degree**
3 Exam	30
3 homework	6
2 classwork	4
Final exam	60
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	"Statistical Analysis of Hydrologic Variables". Ramesh S.V. Teegavarapu, Jose D. Salas and Jery R. Stedinger. Published by the American Society of Civil Engineers, 2019
Main references (sources)	• "Statistical Methods in Hydrology and Hydroclimatology". Rajib Maity. Springer Transactions in Civil and Environmental Engineering. 2018 • "Hydrologic Probability and Statistics". Joseph V. Bellini. PDH online Course H142. 2012.
Recommended books and references (scientific journals, reports…)	_____
Electronic References, Websites	_____

Course Description Form

1. Course Name:

Numerical Analysis

2. Course Code:

DWRE 321

3. Semester / Year:

2/2025-2026

4. Description Preparation Date:

1/9/2025

5. Available Attendance Forms:

Theoretical lectures in class

6. Number of Credit Hours (Total) / Number of Units (Total)

2/3

7. Course administrator's name (mention all, if more than one name)

Name: Ali Ahmed Abdulhadi Email: aliabdulmawjood@uomosul.edu.iq

8. Course Objectives

Course Objectives	The primary aims of this course are to: • Familiarize students with numerical methods for solving complex mathematical problems, including numerical integration, differentiation, and the solutions of differential equations. • Equip students with the skills necessary to obtain accurate numerical solutions to mathematical problems that cannot be solved analytically. Students will develop the ability to analyze and minimize errors and approximations inherent in these methods • Educate students about common sources of error and approximation in numerical methods, including truncation error, rounding error, and discretization error. • Provide students with mastery over the techniques for solving equations in one variable, including the bisection method, secant method, Newton-Raphson method, and fixed-point iteration method. After taking the course. • Allow students to develop a deep understanding of the available methods for solving simultaneous equations

9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourage stude participation in the exercises, while at the same time refining and expanding their critical think skills. This will be achieved through classes and interactive tutorials

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Numerical Methods: Iteration and graphical method	Numerical Solution of Algebraic Equations	Theoretical lectures in class	HW & Exam

2	3	Bisection method	Numerical Solution Algebraic Equations		HW & Exam
3	3	False position method	Numerical Solution Algebraic Equations	Theoretical lectures in class	HW & Exam
4	3	Newton-Raphson's method	Numerical Solution Algebraic Equations	Theoretical lectures in class	HW & Exam
5	3	Maclaurin series	Numerical Series	Theoretical lectures in class	HW & Exam
6-9	12	Taylor's series	Numerical Series	Theoretical lectures in class	HW & Exam
10	3	Euler's method	Numerical Series		HW & Exam
11	3	Runge's -Kutta method	Solution of D.E.	Theoretical lectures in class	HW & Exam
12-13	6	Interpolation:Greagory Newtoi interpolation method	Interpolation	Theoretical lectures in class	HW & Exam
14	3	exam			
15	3	Preparatory week before the final Exam			

11. Course Evaluation

Evaluation type	**degree**
2 quizzes	12
2 homework	8
Term exam	20
Final exam	60
Total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	----------
Main references (sources)	• Burden_Numerical_Analysis_5e_(PWS,_1993) Fundamental Numerical Methods and Data Analysis
Recommended books and references (scientific journals, reports…)	----------
Electronic References, Websites	----------

Course Description Form

1. Course Name:
open channels
2. Course Code:
DWRE 322
3. Semester / Year:
2025-2026
4. Description Preparation Date:
1/2/2026
5. Available Attendance Forms:
Lectures and Tutorials
6. Number of Credit Hours (Total) / Number of Units (Total)
5 hr/5 cridits
7. Course administrator's name (mention all, if more than one name)
Name: Ahmed Y. Mohammed Email: a.altaee@uomosul.edu.iq
8. Course Objectives

Course Objectives	On successful completion of this course students will be able to: 6. Recognize the common physical phenomenon of flow in open channel 7. Classify the type of flow and the properties for each type, with the common empirical equations 8. Define the specific energy of the flow in open channel and connect that with practical cases that happen in reality 9. Route the curve of surface water profile when there is a structure in open channel

9. Teaching and Learning Strategies

Strategy	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, class works and by considering typ 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	Open channel, types and classifications.	Open channel, typ and classifications	Presentation And white board	Monthly exam
2	2	Uniform flow, Chezy and l equations.	Uniform flow, Ch and Mann equations.	Presentation And white board	Monthly exam

3	2	Best hydraulic cross secti	Best hydraulic cr section	Presentation And white board	Monthly exam
4&5	4	Consecration of hydrauli and Manning coefficie	Consecration hydraulic radius a Manning coefficie	Presentation And white board	Monthly exam
6	2	Specific energy and critic	Specific energy critical depth.	Presentation And white board	Monthly Exam
7	2	First monthly exam			
8&9	4	Critical depth with hu contractions	Critical depth wit or contractions	Presentation And white board	Monthly Exam
10	2	Hydraulic jump	Hydraulic jump	white board	Monthly Exam
11	2	Varied flow	Varied flow	white board	Monthly Exam
12	2	water surface profile	water surface pro	white board	Monthly Exam
13	2	Weirs and notches	Weirs and notches	white board	Monthly Exam
14	2	Second monthly exam			
15	2	Preparatory week before the final Exam			

11. Course Evaluation

Evaluation type	**degree**
Quizzes	10
Assignments	10
monthly exam	15
Mid-term exam	15
Final exam	50
total	100

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Vennard, J.K., 1963. Elementary fluid mechanics. edition.
Main references (sources)	Rajput, R.K., 2004. *A textbook of fluid mechanics hydraulic machines*. S. Chand Publishing.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	https://uclouvain.be/en-cours-2023-lbres2104

Course Description Form

1. Course Name:
Groundwater Hydrology
2. Course Code:
DWR 323
3. Semester / Year:
2/2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Theoretical lectures in class and Lab
6. Number of Credit Hours (Total) / Number of Units (Total)
5/3
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Saleh Mohammed Saleh Email: s.zakaria@uomosul.edu.iq Name: Dr. Rasha M.Sami Fadhil Email: Rasha.Fadhil@uomosul.edu.iq
8. Course Objectives

Course Objectives	The groundwater hydrology course is concerned with studying the movement of water in various groundwater reservoirs. After completing the course, the student will be knowledgeable about the following points: The student's knowledge of the importance of groundwater hydrology. The student should be able to understand the movement of groundwater and its flow inside wells. The student should be able to describe the hydraulic characteristics of groundwater reservoirs. Knowledge of the fundamental laws and equations to describe groundwater flow processes. General knowledge of the types and characteristics of groundwater aquifers. The student could be able to use software related to groundwater movement.

9. Teaching and Learning Strategies

Strategy	The primary strategy to be adopted in delivering this course is to encourage students' participation in the exercises, while at the same time improving and expanding their critical thinking skills. This will be achieved through interactive classroom and educational programs and by looking at some issues to motivate students. using Power point presentation Lecture. Handouts, Field trip and you tubes.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	General Introduction - What is groundwater? Groundwater and the water cycle, aquifers, the importance of groundwater, groundwater scenario	A general introduction to groundwater hydrology	Theoretical lectures in class	H.W.
3-2	6	Aquifer characteristics, types of aquifers, confined aquifer	Definitions and terms	Theoretical lectures in class	H.W.

		Unconfined aquifer, percolating aquifer, perched aquifer Characteristics of aquifers, porosity, specific yield, permeability coefficient.			
5-4	6	Laws of groundwater movement: Darcy's law, hydraulic conductivity, transmissibility.	Groundwater movement	Theoretical lectures in class	Exam
7-6	6	Groundwater flow from wells for steady flow: analysis of steady groundwater flow, and steady flow in confined and unconfined aquifers	Groundwater flow from wells for steady flow	Theoretical lectures in class	H.W.
8	3	Monthly exam			
11-9	9	Groundwater flow from wells for unsteady flow: analysis of unsteady groundwater flow, and unsteady flow in confined and unconfined aquifers	Groundwater flow from wells for unsteady flow	Theoretical lectures in class	H.W.
13-12	6	Well hydraulics, well withdrawal, and steady flow to confined flow in the well - unconfined + introducing the student to programs for groundwater hydrology (	Well hydraulics	Theoretical lectures in class	Exam
14	3	Well drilling - penetration speed, diameter, depth, and vibration level.	Drilling wells	Theoretical lectures in class	H.W.
15	3	Review the course content and prepare for the final exam			

Laboratory Experiments:

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2	QGIS Introduction	Getting to know the interface, adding the first layers, navigating the map	Computer Lab	Homework
Week 2	2	Spatial Data Management – Symbols and Cartographic Design	Importing data (Vector & Raster), organizing tables, working with attributes, changing symbols, creating Choropleth maps, adding Labels	Computer Lab	Homework
Week 3	2	Data Creation and Editing	Digitizing, editing attributes, creating new datasets	Computer Lab	Homework
Week 4	2	Spatial Analysis and Working with Raster Data	Reprojection, Network Analysis, Spatial Statistics, Image Processing, Using Elevation Data, Merging and Analyzing Raster Data	Computer Lab	Exam

Week 5	2	Groundwater Model	Understanding the mechanism of calculating well discharge, distribution, and groundwater flow	Computer Lab	Report
Week 6	2	Map and Report Output	Creating dynamic maps, preparing reports and maps for printing	Computer Lab	Homework
Week7	2	Exam 1	Theoretical and Practical Exam	Computer Lab	Exam
Week 8	2	Introduction to GMS	Program interface, how to open a new project, importing basic data	Computer Lab	Homework
Week 9	2	Geological Data Input	Adding geological layers, entering well data and water levels	Computer Lab	Homework
Week 10	2	Conceptual Model Setup –	Defining zones, boundaries, and initial conditions	Computer Lab	Homework
Week 11	2	Grid Creation	Building a MODFLOW grid, defining cells and parameters	Computer Lab	Homework
Week 12	2	Running the Flow Model	Executing MODFLOW, reading basic results, water levels, and flow	Computer Lab	Report
Week 13	2	Results Output	Creating maps and charts, preparing a simplified project report	Computer Lab	Homework
Week 14	2	Exam 1	Theoretical and Practical Exam	Computer Lab	Exam
Week 15	2	Final Exam		Computer Lab	Exam

11. Course Evaluation	
Evaluation type	**degree**
Theoretical lectures	
H. w.	10
Quiz	5
Monthly exam	10
Term exam	5
Final exam	30
Laboratory lectures	
H. w.	5
Quiz	5
Monthly exam	5
Term exam	5
Final exam	20
Total	**100**

12. Learning and Teaching Resources	
Main references (sources)	• Groundwater hydrology (2005) by Todd,D.K., Mays, L. W. Wiley • Groundwater hydrology-Conceptual and computational Models (2003)by K.R.Rushton published by Wiley. • Engineering Hydrology-McGraw-Hill,2008
Electronic References, Websites	https://books.gw-project.org/groundwater-resource-development/part/references/

Course Description Form

1. Course Name:
Drainage Engineering
2. Course Code:
DWRE 324
3. Semester / Year:
2/2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Theoretical lectures in class and practical in lab
6. Number of Credit Hours (Total) / Number of Units (Total)
5/6

7. Course administrator's name (mention all, if more than one name)
Name: Dr. Ahmed A. M. Al-Ogaidi Email: a.alogaidi@uomosul.edu.iq Name: Abdulazeez A. M. Email: abdulazeez.mohammed@uomosul.edu.iq

8. Course Objectives	
Course Objectives	The Drainage Engineering course teaches students a lot of useful things in designing and understanding drainage networks. After completing this course, students are supposed to be familiar with the following points: 10. Definition of drainage, its purpose, evidence and benefits, as well as an overview of the history of drainage in Iraq. 11. Learn the basics of groundwater movement by studying Darcy's law, Laplace's equation, and Dupuis-Forchheimer's equation. 12. Learn about the reclamation of saline soils, salts removal, and the requirements for washing them. 13. Learn the exploratory and design investigations of drainage projects. 14. Studying the various methods used to estimate the hydraulic conductivity of soils in the laboratory and field. 15. Identifying the different drainage systems through their types, planning their locations and depths, and designing filters. 16. Learn the basics of designing surface (open) and subsurface (covered) drainage sections. 17. Designing the distances between the drains in the case of stable and unstable flow. 18. Identifying the vertical drainage (drainage wells). 19. Learn drainage maintenance. 20. The relationship between drainage and environmental pollution.

9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage stude participation in the exercises, while at the same time refining and expanding their critical thinl skills. This will be achieved through classes, interactive tutorials and by considering some challeng problems to motivate students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	Definition of drainage, its purpose, evidence and benefits, as well as an overview of the history of drainage in Iraq.	General introduction on drainage of agricultural lands	Theoretical lectures in class	Exam
2-3	10	Learn the basics of groundwater movement by studying Darcy's law, Laplace's equation, and Dupuis-Forchheimer's equation.	Principles of groundwater hydraulics	Theoretical lectures in class Lab	HW & Exam
4-5	10	Learn about the reclamation of saline soils, salts removal, and the requirements for washing them.	Reclamation of saline soils	Theoretical lectures in class	HW & Exam
6	5	Learn the exploratory and design investigations of drainage projects.	Drainage projects' investigations	Theoretical lectures in class	HW & Exam
7-8	10	Studying the various methods used to estimate the hydraulic conductivity of soils in the laboratory and field.	Estimation of soil hydraulic conductivity	Theoretical lectures in class Lab	HW & Exam
9	5	Identifying the different drainage systems through	Drainage systems	Theoretical lectures in class	HW & Exam

		their types, planning their locations and depths, and designing filters.			
10	5	Learn the basics of designing surface (open) and subsurface (covered) drainage sections.	Design of drains' sections	Theoretical lectures in class	HW & Exam
11-13	15	Designing the distances between the drains in the case of steady and unsteady state flow.	Spacing between drains	Theoretical lectures in class & Lab	HW & Exam
14	5	Identifying the vertical drainage (drainage wells).	Vertical drainage (drainage wells)	Theoretical lectures in class	HW & Exam
15	5	Learn drainage maintenance. The relationship between drainage and environmental pollution.	Drains' maintenance Drainage and water pollution	Theoretical lectures in class	Exam

11. Course Evaluation

Evaluation type	**degree**
4 quizzes	16
7 homework	14
5 labs	5
1 report	5
Midterm exam	10
Final exam	50

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Al-Dabagh, Abdulsattar Younis, and Ali, Angham Ezz Al-Deen. *Drainage Engineering*. Dar Al-Kutob for Printing and Publishing, University of Mosul, Mosul, Iraq, 1992.
Main references (sources)	• Luthin, James N., and James N. Luthin. *Drainage engineering*. No. TC970 L8. New York: Wiley, 1973. • Waller, Peter, and Muluneh Yitayew. *Irrigation and drainage engineering*. Springer, 2015. • Al-Lamy, Muhsin M. A., and L-Janaby, Alaa', S. A. Drainage, investigations, designs, execution and maintenance. Dar Al-Kutob for Printing and Publishing, University of Mosul, Mosul, Iraq, 1991.
Recommended books and references (scientific journals, reports…)	Ostad-Ali-Askari, K., & Shayan, M. (2021). Subsurface drain spacing in the unsteady conditions by HYDRUS-3D and artificial neural networks. *Arabian Journal of Geosciences*, *14*, 1-14.
Electronic References, Websites	http://kcl.digimat.in/nptel/courses/video/126105010/L41.html

Course Description Form

13. Course Name:

Soil Mechanics and Foundations

14. Course Code:

DWRE325
15. Semester / Year:
Spring semester (second) / 2025 -2026
16. Description Preparation Date:
2025/10/15
17.Available Attendance Forms:
Class lectures + Lab. lectures
18.Number of Credit Hours (Total) / Number of Units (Total)
5/75
19. Course administrator's name (mention all, if more than one name)
Name: Zuheir Karabash Email: karabash@uomosul.edu.iq
20. Course Objectives

Course Objectives	The objective of the soil mechanics and foundation Engineering course is to introduce the subject of geotechnical engineering. In this course, the student will understand and be familiar with important topics: soil improvements, compaction, soil investigation, shear stress in soils, bearing capacity of the soil lateral earth pressure and retaining walls, Upon completion of the soil mechanics and foundation engineering course, students should be able to apply principles of soil mechanics and in the analysis, design, and construction of civil engineering projects.

21. Teaching and Learning Strategies

Strategy	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 some challenging problems to motivate students.

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5	Definition of foundation engineering and soil mechanics	Introduction and general formation.	Lecture in class	Class discussions
2	5	Learn about soil investigation and its methods	Soil investigation	Lecture in class	HW and Quiz
3+4+5	5+5+5	Knowing the soil shear strength	Soil shear strength.	Lecture in class	Quiz

		and its parameters and importance			
		Shear strength tests	Soil shear strength determination tests	In Lab.	Report
6+7	5+5	Learn the soil stabilization methods	Soil stabilization.	Lecture in class	Class discussions
		Learn how to estimate soil compaction and field density tests	Compaction test and field density test	In Lab.	Report
8	5	Learn the bearing capacity of the soil	Soil bearing capacity	Lecture in class	Course
9	5	Bearing capacity determination methods	Bearing capacity determination	Lecture in class	Quiz and Course Examination No.1
10	5	Knowledge the analysis and design of footing on clay	Footing on clayey soil.	Lecture in class	Homework assignment
11	5	Knowledge the analysis and design of footing on sand	Footing on sand	Lecture in class	Homework assignment
12	5	Knowledge the analysis and design of footing on rock	Footing on rock	Lecture in class	Homework assignment
13	5	Knowing the lateral earth pressures	lateral earth pressures	Lecture in class	Quiz
14+15	5+5	Learning the analysis and design of retaining walls	Retaining walls	Lecture in class	Quiz

23. Course Evaluation

Evaluation type	**degree**
Homework, classwork, reports (6)	2
Quizzes (2)	5

Term exam (2)	28
Laboratory, experimental part	15
Final exam	50
Total	100

24. Learning and Teaching Resources

Required textbooks (curricular books, if any)	• Al-Asho, M. O "Soil Mechanics Principles", 1990 Student textbook, University of Mosul. الشكرجي ، يوسف والمحمدي، نوري، " هندسة الأسس " ، جامعة بغداد ،الطبعة الاولى،
Main references (sources)	○ Das, B.M. and Sobhan, K. "Principle of Geotechnical Engineering", ninth Edition, Cengage Learning. Das, B. M., "Principle of Foundation Engineering ", Thomson Books/Cole, California State University, Sacramento, 5th ed., 2004. - Peak, R. B., Hanson, W. E. and Thorburn, T.H., " Foundation Engineering ", John Wiley and Sons, 2nd ed., 1974 - Bowles, J.E., P.E., S.E." Foundation Analyses and Design ", The McGraw-Hill Companies, Inc, 5th ed., 2006. -Das, B. M., & Sivakugan, N.," Principles of foundation engineering", Cengage learning, 2018. ○ Coduto, D.P. " Geotechnical Engineering Principle and practices", 1999, Prentice-Hall, Inc. ○
Recommended books and references (scientific journals, reports…)	6. Al-Rafidain Engineering Journal. 7. Highway Research Record, H R R. 8. Journal of the Geotechnical Engineering Division, ASCE. 9. Journal of Soil Mechanics and Foundation Division, Proc. ASCE. 10. Transportation Research Record, TRR. Journal of the Japan Society of C Engineering, JSCE.
Electronic References, Websites	None

1. Course Name:
Consumptive use and water duty
2. Course Code:
DWRE 326
3. Semester / Year:
Second Semester/2025-2026
4. Description Preparation Date:
1/2/2025
5. Available Attendance Forms:
Theoretical lectures in class
6. Number of Credit Hours (Total) / Number of Units (Total)
4hour*15 week=60 hour/4 Units
7. Course administrator's name (mention all, if more than one name)
Dr. Anmar Abdulaziz AL-Talib anmar.altalib@uomosul.edu.iq Alaa ismail naser engalaaismail79@uomosul.edu.iq
8. Course Objectives

Course Objectives	1. how to use mathematical relations in a calculation of the potential Consumptive use(Eto) of different crops . 2. Identify the different stages of crop growth. 3. Draw the crop coefficient curve for different crops. 4. Calculating the water consumption of the crop. 5. Identify the different irrigation efficiencies within the field. 6. Calculation of water duty for irrigation projects . 7. Learn about different irrigation methods and their specifications.

9. Teaching and Learning Strategies	
Strategy	i) An ability to distinguish, identify, define, formulate, and solve engineering problems by applying principles of engineering, science and mathematics.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-2	8	Absolute water consumption - transpiration - evaporation - conditions affecting water consumption - direct measurements of water consumption - Hargreves equation - water consumption of natural plants,	Introducing the student to the importance of calculating plant water consumption	Lecture	
3-4	8	Find crop coefficient Kc for different plants and calculate water consumption of crop ETc, - Meteorology as a guide for water consumption - Plani - Creedli method - Jensen - Hayes method Climate and plant physiology (functions of plant members) and their relevance to water consumption	Introducing the student to how to calculate crop parameters and the most important methods	Lecture	H.W(1)

5	4	Plant growth season - Water consumption needs for crops during the growing season - Practical considerations	Introducing the student to how to calculate the water consumption	Lecture	Daily exam(1)
6-7	8	When to irrigate - and how much water to apply, the soil moisture endpoints, the external appearance of the crop, Use of various crops for water, available water resources, winter irrigation, Autumn irrigation	Introducing the student to how to calculate and determine irrigation dates	Lecture	H.W(2)
8-9	8	The effect of the sedimentary soil layer, the stage of plant growth and its effect on the irrigation method, irrigation during the vegetative growth stage, the method of flowering irrigation	Introducing the student to how moisture is removed	Lecture	H.W(3)
10	4	Midterm Exam			
11,12 and13	12	The method of irrigation during the fruiting period, depth of the root area, irrigation frequency (irrigation rotation), irrigation efficiency, water transfer efficiency, water application efficiency , water use efficiency, water storage efficiency, sprinkler irrigation, other uses of sprinkler networks, basic conditions for sprinkler irrigation system design, sprinkler network design	Introducing students to how to calculate irrigation efficiencies and how to calculate water consumption efficiency, in addition to introducing students to the basics of sprinkler irrigation	lecture	Monthly exam
14-15	8	Drip irrigation, the benefits of drip irrigation, potential problems of drip irrigation, Surface irrigation and underground irrigation (under surface) Free flooding without control, submerged slides, submerged docks, internal irrigation, hydraulic surface irrigation			

11. Course Evaluation

Evaluation type	**Degree**
2 quizzes	10%
4 homework	5%
Term exam	25%
Final exam	60%
Total	100%

12. Learning and Teaching Resources

Required textbooks (curricu books, if any)	• Irrigation principles and practices , by V.E. Hansen ,O.W.Israelsenand G.F. Stringham, fourth edition, john wiley and sons., 1984.
Main references (sources)	• Crop water requirements (FAO – 24 • -Crop evapotranspiration –guide lines for computing crop water requirements (FAO –56) • Design manual for irrigation &drainage- ministry of irrigation-Iraq (pencol),1980
Electronic References, Websit	https://classroom.google.com/c/ODE1NzgxMTk4OTg4

Course Description Form

1. Course Name:

Planning and Designing of Engineering Projects

2. Course Code:

DWRE 327

3. Semester / Year:

Second / 2025−2026

4. Description Preparation Date:

14/1/2026

5. Available Attendance Forms:

Lectures in the classroom.
A practical lecture conducted in the laboratory.

6. Number of Credit Hours (Total) / Number of Units (Total)

2 hours/ 2 credits

7. Course administrator's name (mention all, if more than one name)

Dr. Anmar Abdulaziz Al-Talib Email: anmar.altalib@uomosul.edu.iq
Dr. Zeyad Ayoob Sulaiman Email: z.alsinjari@uomosul.edu.iq

8. Course Objectives

Course Objectives	After successfully completing this course, the student is expected to understand the na and characteristics of engineering projects, comprehend the engineering project life c and its different phases, and systematically analyze engineering problems to identify t root causes. The student is also expected to acquire the ability to define project scope identify stakeholders, as well as to participate in the preparation of preliminary plans engineering projects in terms of time, resources, and risks. The course also aims to introduce students to the specific characteristics of water resou engineering projects and their technical and environmental complexities, and to dev analytical thinking and engineering decision-making skills. This prepares graduates effective participation in the planning and implementation of engineering projects provides a suitable foundation for some postgraduate courses in project management engineering

9. Teaching and Learning Strategies

Strategy	The main teaching strategy for this course is based on a combination of theoretical lectures, classroom discussions, and the analysis of real-world case studies, with an emphasis on encouraging active student participation and critical thinking. The course also focuses on linking theoretical concepts with practical applications in water resources engineering projects, and on developing students' skills in analysis, problem-solving, and teamwork.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Explain the concept and characteristics of engineering projects and distinguish between	Introduction to Engineering Projects	Theoretical Lectures	—

		engineering projects and operational activities	and Their Characteristics		
2	2	Describe the stages of the engineering project life cycle and explain the objectives of each stage	Engineering Project Life Cycle and Its Phases	Theoretical Lectures	—
3	2	Analyze engineering problems and identify their root causes using systematic analytical methods	Engineering Problem Analysis and Root Cause Identification	Theoretical Lectures	Homework (1)
4	2	Define project scope accurately and identify stakeholders and analyze their roles and influence	Project Scope Definition Stakeholders	Theoretical Lectures	—
5	2	Apply engineering design methodology and generate appropriate design alternatives for engineering projects	Engineering De Methodology Alternatives Generation	Theoretical Lectures	Quiz (1)
6	2	Develop a Work Breakdown Structure (WBS) and decompose the project into manageable activities	Work Breakdown Struc (WBS)	Theoretical Lectures	—
7	2	Prepare a preliminary project schedule and estimate durations of engineering activities	Project Scheduling	Theoretical Lectures	—
8	2	Analyze the Critical Path Method (CPM) and identify critical activities and their impact on project duration	Critical Path Method (C and Applications	Theoretical Lectures	Midterm Exam
9	2	Plan human and material resources and define responsibilities within the engineering project	Resource Management Responsibilities	Theoretical Lectures	—
10	2	Identify potential risks in engineering projects, evaluate them, and propose mitigation measures	Risk Management Engineering Projects	Theoretical Lectures	Project
11	2	Apply monitoring and evaluation techniques to compare actual performance with planned performance and take corrective actions	Project Monitoring Evaluation	Theoretical Lectures	—
12	2	Explain the specific characteristics of water resources engineering projects in terms of planning, execution, and environmental risks	Characteristics of W Resources Enginee Projects	Theoretical Lectures	Quiz (2)
13	2	Explain the principles of engineering ethics and relate them to sustainability concepts in projects	Engineering Ethics Sustainability	Theoretical Lectures	Homework (2)
14	2	Review and integrate course concepts and prepare for the final evaluation through discussion and analysis	General Review	Presentation	Project Submission
15	2	Apply the acquired concepts and theories of the course in an integrated manner	General Review	Discussion	—
16	3	Preparatory week before the final examination	—	—	Final Exam

11. Course Evaluation

Evaluation type	Degree
2 Quizzes	7.5
2 Homeworks	5
Project	5
Midterm Exam	12.5

Final Exam	60
Total	**100**

12. Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	• Project Management Institute, *PMBOK Guide*. Chitkara, K. K., *Engineering Project Management*
Recommended books and references (scientific journals, reports…)	• Dym, C. L., *Engineering Design*. Program Design and Planning Manual.
Electronic References, Websites	

Fourth Level

18 UNITS

Code	Module	Theoretical	Practical	Applied	Units
DWRE401	Design of Hydraulic Structures I	2	2	1	3
DWRE402	Design of Gravity Irrigation Systems	2	2	1	3
DWRE403	Design of irrigation and drainage networks I	1	2	-	2
DWRE404	Estimation and engineering Specifications I	1	2	-	2
DWRE405	Economic Sciences	2	-	2	2
DWRE406	Dams Engineering I	2	-	2	2
DWRE407	Foundation Engineering I	2	-	-	2
DWRE408	Engineering Project I	-	4	-	2

18 UNITS

Code	Module	Theoretical	Practical	Applied	Units
DWRE409	Design of Hydraulic Structures II	1	2	1	2
DWRE410	Design of Sprinkler and Drip Irrigation Systems	1	2	1	2
DWRE411	Design of irrigation and drainage networks II	1	2	-	2
DWRE412	Estimation and engineering specifications II	1	2	-	2
DWRE413	Engineering Management	2	-	2	2
DWRE414	Dams Engineering 2	2	-	2	2
DWRE415	Foundation Engineering II	2	-	-	2
DWRE416	Engineering Project II	-	4	-	2
DWRE417	Applied Sciences	2	-	-	2

Course Description: "Design of Hydraulic Structures I"

1. Course Name:
Design of Hydraulic Structures I
2. Course Code:
DWRE 401
3. Semester / Year:
1/ 2025−2026
4. Description Preparation Date:
9/2025
5. Available Attendance Forms:
In-person
6. Number of Credit Hours (Total) / Number of Units (Total)
5/3
7. Course administrator's name (mention all, if more than one name)
Name: Nashwan Kamal Aldeen Mohammed Email: nashwan.alomari@uomosul.edu.iq
8. Course Objectives

Course Objectives	• To identify and classify the hydraulic structures and their safety requirements. (ii) • To develop a design of the hydraulic structure floor length that satisfies requirements. (ii) • To applying all standards and design criteria to find the suitable soil types for this structure. (ii) • To design the floor thickness of the hydraulic structure and find the appropriate floor thickness. (ii) • To give valuable recommendations that can be considered to prevent this rupture. (ii)
9. Teaching and Learning Strategies	
Strategy	The primary strategy that will be adopted in delivering this module is to encourage students' participation in classes, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials, and practical designing of the hydraulic structures. PowerPoint presentations and boards are used in the classroom. Examples and problems will be solved and illustrated on the classroom board. Tutorials are also organized to establish closer contact with students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**4**	Classify the hydraulic structures and their uses,	Subject topics - Introduction of types of hydraulic structures	Presentation	
2, 3, 4, and 5	**16**	1. Recognize problems accompanying water seepage under the hydraulic structures, 2. Apply the basic concepts of engineering to calculate seepage and uplift pressure under different hydraulic structures,	Irrigation structures on permeable foundations. Seepage and Uplift pressure – Bligh theory – Lane theory– Flow net analysis- Khosla's theory	Presentation & whiteboard	Quiz1, and Assignment 1
6	**4**	Recognize the components of Protection works of approaches for horizontal floor	Protection works of approaches for horizontal floor	Presentation	
7, 8, 9, and 10	**16**	Identify the components of the stilling basin and design some of their types.	Hydraulic jump and energy dissipation devices - drawing of hydraulic jump-Stilling basins (R.S.Varshney stilling basin, SAF stilling basin, U.S.B.R II stilling basin).	Presentation & whiteboard	Quiz2, Assignment2, and Monthly exam
11, 12, 13, and 14	**16**	1. Develop the ability of the students to solve design problems and analyze the data to evaluate the feasibility of components of the head and cross-regulator 2. Assess and analyze the safety of the head and cross regulator,	Head and Cross regulator	Presentation & whiteboard	Term exam
15	**4**	Demonstrate the ability to lead and productively participate in group situations by assigning multidisciplinary design projects for some hydraulic structures	a design and apply the example of the cross and head regulator + General Revision	Presentation & whiteboard	

1. Course Evaluation	
Evaluation type	**Degree**
2 Quizzes	8
2 Assignments	8
Monthly Exam	10
Term Exam	14
Final Exam	60
Total	100

2. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Varshney, R.S., Gupta, S. C., Gupta, R. L., (1979) "*Theory & design of irrigation structures*". Nem Chand & Bros; Roorkee, India.
Main references (sources)	1. Asawa, G. L. (2008) "*Irrigation and Water Resources Engineering*" New age International(P) Limited, Publishers. 2. Chanson, Hubert., (2004) "*The Hydraulics of Open Channel Flow: An Introduction*" Elsevier. 3. Chow, Ven te., (1959) "*Open Channels Hydraulics*" Mc Graw Hill. 4. Schall, J.D., Thompson, p. L., Zeryes, S. M., Kilgore, R. T., and Morris, J. L. (2012) "*Hydraulic design of Highway culverts* " (Report No . FHWA – HIF – 12 – 026 HD55).
Recommended books and references (scientific journals, reports…)	None
Electronic References, Websites	None

Course Description Form

1. Course Name:

Design of Gravity Irrigation Systems

2. Course Code:

DWR 410

3. Semester / Year:

Spring/ 2025-2026

4. Description Preparation Date:

15-3-2025

5. Available Attendance Forms:

In person

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. Zeyad Ayoob Sulaiman, Mr. Mohammed Tareq Mahmood
Email: z.alsinjarii@uomosul.edu.iq

8. Course Objectives

Course Objectiv	Students who successfully complete this course have: 1. Learned characteristics of various methods of surface irrigation systems, (i) 2. Understood economics of irrigation, (i) 3. Able to design various types of gravity irrigation systems after collecting the required design data and analyzing these data in a way that suits the design of the surface irrigation system design, (i) and (ii) 4. Able to select a suitable irrigation system for a given situation, (ii) 5. Able to select the most economic irrigation design alternative, (vi)

9. Teaching and Learning Strategies

Strategy	Power point presentation Lecture. Handouts, Field trip and you tubes

10. Course Structure

Week	Hours	L. O	Unit or subject name	Learning method	Evaluation method
1	4	i	Introduction to the farm irrigation and the basics of system desi	Powerpoint Whiteboard discussion	H.W
2	4	i	Basic design Factors/Consumptive use/Soil/Irrigation interval water application depth	Powerpoint Whiteboard doscussion	exam
3	4	i	Efficiency ,adequacy ,and uniformity of irrigation	Powerpoint Whiteboard doscussion	H.W
4	4	i&ii	Water infiltration into soil	Powerpoint Whiteboard doscussion	exam
5	4	i&ii	Land grading/Description ,criteria ,and preparatory steps/ Desig land grading/Slopes and field levels	Powerpoint Whiteboard doscussion	exam

6	4	ii	Earthwork balance and earthwork calculations	Powerpoint Whiteboard doscussion	exam
7	4	ii	Surface irrigation/Mechanism of surface irriga process/Infiltration opportunity time and application depth	Powerpoint Whiteboard doscussion	H.W
8	4	ii	Water balance concept in surface irrigation	Powerpoint Whiteboard doscussion	exam
9	4	ii	Border irrigation system/Assumptions ,considerations limitations of design/Miscellaneous notes	Powerpoint Whiteboard doscussion	exam
10	4	vi	Design flow rate/Flow depth/Maximum border length/Border w	Powerpoint Whiteboard doscussion	exam
11	4	ii	Furrow irrigation/Furrow intake characteristics/ Considerati assumptions, limitations, and design equations	Powerpoint Whiteboard doscussion	H.W
12	4	i&ii	Runoff control techniques	Powerpoint Whiteboard doscussion	exam
13	4	vi	Cutback irrigation, Runoff recovery system	Powerpoint Whiteboard doscussion	H.W
14	4	vi	Basin irrigation/ Considerations, assumptions, limitations, design equations/Booher method	Powerpoint Whiteboard doscussion	exam
15	4	I,ii vi	Final Exam		Exam

11.Course Evaluation

Four Exams, (each 3pt)	12pt
Midterm Exam	20pt
Homework	8 pt
Final Exam	60pt
Total	100pt

12.Learning and Teaching Resources

Required textbo (curricular books, if any	On-farm irrigation systems engineering\by A.Y.Hachum, and H.I.Yasin. textbook- M University,1992.
Main references (source	Recahrd H. Cuenca Irrigation System Design: An Engineering Approach, 1989.
Recommended books and references (scientific journals, reports...)	
Electronic Referen Websites	https://www.youtube.com/channel/UCg_SvLC7LCRLmVtTAp yLA/videos

Course Description Form

1. Course Name:

Design of irrigation and drainage networks I

2. Course Code:

DWRE 403

3. Semester / Year:

First 2025-2026

4. Description Preparation Date:

1/9/2025

5. Available Attendance Forms:

Lectures and Tutorials

6. Number of Credit Hours (Total) / Number of Units (Total)

3 hr/2 cridits

7. Course administrator's name (mention all, if more than one name)

Name: Azza Nasralla Jaralla Al-Talib
Email: a.altalib@uomosul.edu.iq
Abdul Ghani Khalaf Muhammad
alrobaai1982@uomosul.edu.iq

8. Course Objectives

Course Objectives	• **Inform students about the principles of naming and numbering the canals and drain networks i** • **learn canals and drains layout on contour maps i** • **Inform about water supply systems and calculating discharge in canals sections i,ii** • **Inform types of earth canals and their design i ,ii** • **Lear drawing the synoptic diagram for canals and drains ii** • **Lear methods of calculating seepage from earth canals i,ii**

9. Teaching and Learning Strategies

Strategy	The strategy is to provide theoretical lectures using presentations and question solving in an interactive way with students inside the classroom, as well as tutorials exercises.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Learn about Naming and Numbering, i irrigation and drainage networks	Naming and numberi for irrigation and drainage networks	Presentation And white board	Monthly exam
2	2	Learn layout of irrigation and drainage networks on contour maps, i	layout of irrigation and drainage networks	Presentation And white board	Monthly exam
3	2	Learn water supply Systems,i	water supply systems	Presentation And white board	Monthly exam
4&5	4	Learn calculating Discharge for different Irrigation systems,i	Calculating discharges for canals.	Presentation And white board	Monthly exam

6	2	Inform types of earth Canal and design using Lacey equations ,i ,ii	types of earth Canal and design using Lacey equations	Presentation And white board	Monthly Exam
7	2	First monthly exam			
8&9	4	Learn design of earth Canal using general Design method i,ii	design of earth Canal using general Design method	Presentation And white board	Monthly Exam
10	2	Learn drawing ground Profiles for canal Networks,ii	drawing ground Profiles for canal networks	white board	Monthly Exam
11	2	Learn drawing ground Profiles for drainage Networks,ii	drawing ground Profiles for drainage networks	white board	Monthly Exam
12	2	Learn drawing the Synoptic diagram For canals,ii	drawing the Synoptic diagram For canals	white board	Monthly Exam
13	2	Learn drawing ground Profiles for drain Networks,ii	drawing ground Profiles for drain networks	white board	Monthly Exam
14	2	Learn drawing the Synoptic diagram For drains,ii	drawing the Synoptic diagram For canals	white board	Monthly Exam
15	2	Second monthly exam			

11.Course Evaluation

Evaluation type	**degree**
First monthly exam	20
Second monthly exam	20
Final exam	60
total	100

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Design Manual for Irrigation and Drainage, Pencol Engineering Consultants, London
Main references (sources)	Theory and Design of irrigation structures (vol.1 Varshney,R.S. ,Gupta,S.C. and Gupta, R. NEMCHAND BROS, ROORKEE,INDIA,1977
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://uclouvain.be/en-cours-2023-lbres2104

Course Description Form

1. Course Name:

Estimation and engineering Specifications I

2. Course Code:

DWRE404

3. Semester / Year:

1/2025-2026

4. Description Preparation Date:

1/9/2025

5. Available Attendance Forms:

Theoretical lectures in class and lectures in the lab

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 A. khattab Email: m.almukhttar@uomosul.edu
Name: Ahmed abdalhameed Email: ahmed.abdal-hameed@uomosul.edu.iq

8. Course Objectives

Course Objectives	In ENDWR404, initially students will learn how to estimation the quantities of materials for buildings and Earth works calculations for irregular cross-sections structural in additional structural drawing Upon successful completion of this course the student shall be able to: 1. Knowing the types of estimation and its benefits i 2. Excavation **i** 3. Foundations, stripe and raft **i** 4. Cubed wall works and estimation of materials. **i** 5. Block building, bricks building, stone building **i** 6. Wood form works **i** 7. Analysis Reinforced of slabs **ii** 8. Analysis Reinforced of beams **ii** 9. Design and Draw (Map of house+ foundation map+ section in wall) **ii** 10. Design and Draw (Reinforced of slab map) **ii** 11. Design and Draw (Reinforced of beam map) **ii** 12. Design and Analysis of Finishing works **ii**

9. Teaching and Learning Strategies

Strategy	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 some challenging problems to motivate students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Knowing the types of estimation and its benefits (i)	Introduction to Estimation and Materials Specification,	Theoretical lecture in class and lecture in the lab	HW

		Design and Draw Map of house (ii)	Introduction; syllabus; Draw (house plan).		
2	3	Excavation i Design and Draw (foundation map+ section in wall) **(ii**)	Excavation of Foundations Excavation of stripe and raft foundation, draw (elevations, sectional elevation, foundation plan, wall section).	Theoretical lecture in class and lecture in the lab	HW
3-4	6	Foundations, stripe and raft (i)	Foundations Estimation of (cement, sand, gravel) for stripe and raft foundation, draw (stair ways plan. reinforced of stair). Estimation of steel reinforced Estimation of steel reinforced for stripe and raft foundation, draw (slabs and beams).	Theoretical lectures in class and lectures in the lab	HW & Exam
5	3	Cubed wall works and estimation of materials. (i)	Cubed wall works Cubed wall works and estimation of materials	Theoretical lectures in class	HW
6-8	6	Block building, bricks building, stone building (i)	Walls stone building, bricks building, block building. Bricks building estimation of materials Block building, estimation of materials	Theoretical lectures in class	HW & Exam
9-10	6	Wood form works (i)	Wood form works estimation of materials for wood form types	Theoretical lectures in class	HW & Exam
11-13	6	Learn the basics of designing surface (open) and subsurface (covered) drainage sections. (ii)	Design of drains' sections	Theoretical lectures in class	HW & Exam
11-13	6	Analysis Reinforced of slabs (ii) Analysis Reinforced of beams (ii) Design and Draw (Reinforced of slab map) **(ii)** Design and Draw (Reinforced of beam map) **(ii)**	Reinforced estimation of materials for reinforced of slab. Reinforced of beams estimation of materials for reinforced of beams, draw (reinforced of Structural construction)	Theoretical lectures in class and lectures in the lab	HW

14-15	6	Design and Analysis of Finishing works (ii)	Finishing works Estimation of materials for finishing works	Theoretical lectures in class	HW

11.Course Evaluation

Evaluation type	**Degree**
H W & Sheets (each 1 pt)	10
Two Monthly exam(each 10 pt)	20
Midterm Exam	20
Final Exam	50
Total	100

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• VANZIRANI, V.N., CHANDOLA, S.P. "Civil Engineering Estimating and Costing ". first edition, 1982.
Main references (sources)	• Civil Engineering and Costing, S.P. Mahajan, 624. 1042, M214. • 3. Estimating Building and Construction, 692.5, H816, 73-119.
Recommended books and references (scientific journals, reports...)	----------
Electronic References, Websites	----------

Course Description Form

1. Course Name:

Economic Sciences

2. Course Code:

DWRE 405

3. Semester / Year:

2025-2026

4. Description Preparation Date:

1/9/2025

5. Available Attendance Forms:

Theoretical classroom lectures

6. Number of Credit Hours (Total) / Number of Units (Total)

4/2

7. Course administrator's name (mention all, if more than one name)

Name: Dr.Rasha M. Sami Email: :rasha.fadhil@uomosul.edu.iq

8. Course Objectives

Course Objectives	Upon completion of this course, students will be able to: • Understand and apply the basic concepts of engineering economics (ii) • Prepare an economic feasibility study (ii) • Evaluate and analyze engineering projects economically (ii) • Compare engineering alternatives to select the most feasible and efficient (ii)

9. Teaching and Learning Strategies

Strategy	The main strategy adopted in delivering this course is to encourage student participation in exercises while simultaneously improving and expanding their critical thinking skills. This will be achieved through interactive classroom and tutorials, and by exploring specific issues to motivate students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Principles of Engineering Economics Cash Path Diagram	Fundamentals of Engineering Economics	Theoretical Lectures in Classroom,	Exam
3-2	8	Uniform annuity series, graduated annuity series, regular and effective interest rates, simple and compound interest	Fundamentals of Engineering Economics	Theoretical Lectures Classroom,	Exam
5-4	8	Evaluation and comparison of engineering projects	Present worth Method	Theoretical Lectures Classroom,	Exam

7-6	8	Evaluation and comparison of engineering projects	Future worth method	Theoretical Lectures Classroom,	Exam
8	2	Solve problems			
8	2	Exam			
10-9	8	Evaluation and comparison of engineering projects	Annual worth method	Theoretical Lectures Classroom,	Exam
11-12	8	Economic Project Studies	Preparing an economic feasibility study for projects	Theoretical Lectures Classroom,	Exam
14-13	8	Project Management from a Financial Perspective	Project pricing. Cash flow and advance forecasting.	Theoretical Lectures Classroom,	Exam
15	2	Exam			
15	2	Preparatory week before the final Exam			

Laboratory Experiments:

11.Course Evaluation	
Evaluation type	**degree**
Monthly exam:	20
Semester exam:	20
Final exam:	60
Total: 100	100

12.Learning and Teaching Resources	
• Engineering Economy (7th ed.), L. Blank and A. Tarquin (2012), McGraw-Hill . • Water Resources Systems Planning and Management, S.K. Jain and V.P. Singh (2003), Elsevier. • Water Resources Handbook for Economics, NRCS .(1998) Engineering Economic Analysis, Oxford, New York,200	

Course Description Form

1. Course Name

Dams Engineering I

2. Course Code:

DWRE 406

3. Semester / Year

Fall semester / 2025-2026

4. Description Preparation Date

1/9/2025

5. Available Attendance Forms:

Theoretical lectures in class

6. Number of Credit Hours (Total) / Number of Units (Total)

60/4

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Sahar Sameer Younus
Email: s.alhilali@uomosul.edu.iq
Name: Ali Ahmed Abdulmawjood
Email: aliabdulmawjood@uomosul.edu.iq

8. Course Objectives

Course Objectives	• An ability to specify the type of gravity dam according to the conditions of • valley. (ii) • An ability to analyses the forces that affected to gravity (ii) • An ability to identify the solutions for the problems that may be appear in the analyses of gra dams. (ii) • An ability to specify the type of arch dam according to the conditions of valley. (ii) • Formulate a preliminary design of gravity base on the chosen type. (ii) • Formulate a preliminary design of arch Dams base on the chosen type. (ii)

9. Teaching and Learning Strategies

Strategy	The aim of this course is to present number of sessions during fifteen weeks. These sessions include different subjects are introduced to the students. The fourth-class students should be awareness about the hydrological aspects which related to the hydraulic designs of dams. The objectives of dams and reservoirs construction are explained in detail. This course will cover different subjects related to the design of gravity and arch dams. These subjects are types of gravity and arch dams, types of foundation, modes of failure in gravity dams, Design of gravity dams, in addition to the analyses all of the forces and stresses which effected to the body of the dam with taking into consideration the specificity of each type of dams.

10. Course Structure

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

2	4	Introduction to D Engineering, Stor Works, Hydrolog Aspects, Geologi Investigations, Reservoir Site Selection, Storag Zones of a Reserv	Hydrological aspects of dam	Theoretical lectures in class	Exame
2	4	Reservoir Storage Capacity Estimat Live Storage (Tabulation Meth Sequent Peaks Analysis, Optimization Analysis)	Reservoir Storage Capacity	Theoretical lectures in class	HW and Exame
1	2	Reservoir Sedimentation	Reservoir Sedimentation	Theoretical lectures in class	HW and Exame
1	2	The probable life the reservoir		Theoretical lectures in class	HW and Exame
1	2	Classification of dams, Factors governing the selection of a particular type of dam	Classification of dams	Theoretical lectures in class	Exame
1	2	Gravity dams (Advantages, Disadvantages)	Gravity dams	Theoretical lectures in class	Exame
1	2	Gravity dams (Modes of failure and criteria for structural stability gravity dam)	Gravity dams	Theoretical lectures in class	Exame
1	2	Gravity dams (Principles and sh stress)	Gravity dams	Theoretical lectures in class	HW and Exame
1	2	Elementary profil of the gravity dar (Design considerations) (Stresses development in a elementary profil	Gravity dams	Theoretical lectures in class	HW and Exame
2	4	Arch dams	Arch dams	Theoretical lectures in class	HW and Exame

11.Course Evaluation

1 quizzes	10pts
2 homework	10pts
Term Exam	20pts
Final Exam	60pts
Total	100pts

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Hydraulics of Dams and Reservoirs, By: Fuat Senturk, W Resources Publications, Colorado, U.S.A.,1994. 2. Theory and Design of Irrigation Structures, Vol. II, By: R Varshney, S. C. Gupta and R. L. Gupta, Nem Chand & Bros, Roo (U.P.), India,1982. 3. Earth-Rock Dams, Engineering Problems of Design Construction, By: J. L. Sherard, R. J. Woodward, S. F. Gizienske W. A. Clevenger, John Wiley and Sons, Inc., New York, 1963. 4. Engineering for Dams, By: W. P. Greager, J. D. Justin and J. Hi In three Volumes, John Wiley and Sons, Inc., New York, 1961.
Main references (sources)	----------
Recommended books and references (scientific journals, reports...)	Loucks, D. P., Van Beek, E., Stedinger, J. R., Dijkman, J. P., and Vil M. T. (2005). Water Resources Systems Planning and Management Introduction to Methods, Models and Applications. Paris, UNESC
Electronic References, Websites	https://classroom.google.com/c/ODA5Nzg0MTYwODg2

Course Description Form

1. Course Name:	
Foundation Engineering I	
2. Course Code:	
DWRE407	
3. Semester / Year:	
The first course/ 2025 -2026	
4. Description Preparation Date:	
1/9/2025	
5. Available Attendance Forms:	
Class lectures + Electronic lectures	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hours/ 2 credits	
7. Course administrator's name (mention all, if more than one name)	
Name: **I. M. A. Al-kiki** Email: **i.alkiki@uomosul.edu.iq** **Dr.Mohammed M. Khalaf** Email: **mohammedmukhlifkhalaf@uomosul.edu.iq**	
8. Course Objectives	
Course Objectives	**The optimal, good, economical and safe design of engineering pedestrian foundations (surface foundations) in terms of the student's familiarity with:** • **Soil investigations and exploration to choose the appropriate (foundation type, foundation depth, foundation dimensions, foundation shape).** • **Analysis and distribution of stresses under foundations.** • **Subsidence and joining under foundations.** • **Soil bearing capacity.** • **Analysis and design of retaining walls.**
9. Teaching and Learning Strategies	

Strategy	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 some challenging problems to motivate students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	**Defining foundation geometry and knowing the type of foundations**	**Introduction and general information**	**Lecture in class**	**Class discussions**
2	**2**	**Explaining the purpose of soil investigations and the methods used**	**Soil investigation and description**	**Lecture in class**	**My class and homework assignment**
4 + 3	**4**	**The ability to distribute stresses under foundations and know the amount of subsidence under them**	**Stress distribution, Settlement and consolidation estimation below the foundations**	**Lecture in class**	**Daily exam**
6 + 5	**4**	**Knowing the problems of different types of soils under foundations and how to address them**	**Foundation on the expansive , collapse and rock soils**	**Lecture in class**	**My class and homework assignment**
7	**2**	**Ability to calculate lateral pressure of soil**	**Lateral earth pressure**	**Lecture in class**	**Class discussions**
9 + 8	**4**	**Ability to analyze and design retaining walls**	**Retaining walls**	**Lecture in class**	**First course examination No.1**
10	**2**	**Know the concept of soil bearing capacity**	**Bearing capacity of the soil**	**Lecture in class**	**Class discussions**
11 + 12	**4**	**Knowledge of methods for calculating soil bearing capacity**	**Methods of bearing capacity determinations**	**Lecture in class**	**My class and homework assignment**
13	**2**	**Knowledge of analysis and design of foundations on clay and plastic silty soils**	**Foundation on clayey soil and plastic silt soil**	**Lecture in class**	**Daily exam**
14	**2**	**Knowledge of analysis and design of foundations on sandy soil and non-plastic silt**	**Foundation on sandy soil and non-plastic silt soil**	**Lecture in class**	**My class and homework assignment**
15	**2**	**Knowledge of analysis and design of foundations on rocky soil**	**Foundation on rock**	**Lecture in class**	**First course examination No.2**

11.Course Evaluation

Evaluation type	Degree
Homework, classwork, reports (6)	6
Quizzes (2)	8
Term exam (2)	24
Final exam	60
Total	100

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	- الشكرجي ، يوسف والمحمدي، نوري، " هندسة الأسس " ، جامعة بغداد ،الطبعة الاولى، 1985
Main references (sources)	-Das, B. M., "Principle of Foundation Engineering ", Thomson Books/Cole, California State

	University, Sacramento, 5th ed., 2004. - Peak, R. B., Hanson, W. E. and Thorburn, T.H., " Foundation Engineering ", John Wiley and Sons, 2nd ed., 1974 - Bowles, J.E., P.E., S.E." Foundation Analyses and Design ", The McGraw-Hill Companies, Inc, 5th ed., 2006. -Das, B. M., & Sivakugan, N.," Principles of foundation engineering", Cengage learning, 2018.
Recommended books and references (scientific journals, reports...)	11. Al-Rafidain Engineering Journal. 12. Highway Research Record , H R R. 13. Journal of the Geo technical engineering Division , ASCE. 14. Journal of Soil Mechanics and Foundation Division, Proc. ASCE. 15. Transportation Research Record , TRR. 16. Journal of the Japan Society of Civil Engineering , JSCE. 17. The Quarterly Journal of Engineering Geology.
Electronic References, Websites	None

Course Description Form

1. Course Name:
Design of Hydraulic Structures II
2. Course Code:
DWR 446
3. Semester / Year:
2/ 2025−2026
4. Description Preparation Date:
1/2/2026
5. Available Attendance Forms:
In-person and electronic (Google Classroom - 52yqcxag)
6. Number of Credit Hours (Total) / Number of Units (Total)
4/3
7. Course administrator's name (mention all, if more than one name)
Name: Nashwan Kamal Aldeen Mohammed Email: nashwan.alomari@uomosul.edu.iq
8. Course Objectives

Course Objectives	• To identify the canal headwork, its use, and perform barrage design steps and requirements. (ii) • To understand the importance of using channel transitions and develop the ability to design a transition. (ii) • To be able to design a syphon structure (as a sample of cross drainage works). (ii) • To understand and be able to design some hydraulic structures (culverts and Sharda-type falls). (ii)

9. Teaching and Learning Strategies

Strategy	The primary strategy for delivering this module will be to encourage students' participation in class while refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials, and practical design of the hydraulic structures. PowerPoint presentations and boards are used in the classroom. Examples a problems will be solved and illustrated on the classroom board. Tutorials are a organized to establish closer contact with students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1, 2, 3, 4, and 5	**20**	Develop the ability of the students to solve design problems and analyze the data to evaluate the feasibility of components of the canal headwork (barrage types). In addition, assess and analyze the safety of the canal headwork structure (barrage types).	Design of canal structures (canal head work).	Presentation & whiteboard	Quiz, Assignment, and monthly exam
6, and 7	**8**	Develop students' ability to solve design problems and analyze data to evaluate types of flow transition.	Transition. Introduction of transitions (R.S Chaturvedi's, Mitra's, and Hind's transitions). Design of transitions (Hind's transitions).	Presentation & whiteboard	Assignment

8, 9, and 10	**12**	Develop the ability of the students to solve design problems and analyze the data to evaluate the cross drainage works (Design example of a syphon).	Cross drainage works.	Presentation & whiteboard	Quiz and Assignment
11, 12, 13, and 14	**16**	Develop the ability of the students to design of the culvert	Culvert. Introduction and design example of the culvert.	Presentation & whiteboard	Term exam
15	**4**	Develop and solve the design of the canal falls (Sharda-type fall).	Canal Falls. Design of the canal falls (Sharda-type fall).	Presentation & whiteboard	

3. Course Evaluation

Evaluation type	**Degree**
Quizzes + class work + H.W (If requested)	12
Monthly Exam	12
Term Exam	16
Final Exam	60
Total	100

4. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Varshney, R.S., Gupta, S. C., Gupta, R. L., (1979) "*Theory & design of irrigation structures*". Nem Chand & Bros; Roorkee, India.
Main references (sources)	5. Asawa, G. L. (2008) "*Irrigation and Water Resources Engineering*" New age International(P) Limited, Publishers. 6. Chanson, Hubert., (2004) "*The Hydraulics of Open Channel Flow: An Introduction*" Elsevier. 7. Chow, Ven te., (1959) "*Open Channels Hydraulics*" Mc Graw Hill. 8. Schall, J.D., Thompson, p. L., Zeryes, S. M., Kilgore, R. T., and Morris, J. L. (2012) "*Hydraulic design of Highway culverts* " (Report No . FHWA – HIF – 12 – 026 HD55).
Recommended books and references (scientific journals, reports…)	None
Electronic References, Websites	None

1. Course Name:

Design of Sprinkler and Drip Irrigation Systems

2. Course Code:

DWR 410

3. Semester / Year:

Fall/ 2025-2026

4. Description Preparation Date:

15-3-2025

5. Available Attendance Forms:

In person

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. Zeyad Ayoob Sulaiman, Mr. Muaad Majid Klekan
Email: z.alsinjarii@uomosul.edu.iq

8. Course Objectives

Course Objectiv	**Students who successfully complete this course have:** **1. Learned characteristics of sprinkler and drip irrigation systems, (i)** **2. Understood economics of irrigation, (i)** **3. Able to design various types of pressurized irrigation systems after collecting the requi design data and analyzing these data in a way that suits the design, (i) and (ii)** **4. Able to select a suitable irrigation system for a given situation, (ii)** **5. able to select the most economist irrigation design alternative, (vi)**

9. Teaching and Learning Strategies

Strategy	Power point presentation Lecture. Handouts, Field trip and y tubes

10. Course Structure

Week	Hours	L. O	Unit or subject name	Learning method	Evaluation method
1	4	i	Sprinkler irrigation Sprinkler irrigation basic concept Advantages and problems of sprinkler irrigation Basic and supplementary components Types of sprinkler irriga systems	Powerpoint Whiteboard discussion	H.W
2	4	i	Fundamentals of sprinkler irrigation Single sprinkler water distribution Layout of stationary system/Hydraulic of sprinkler nozzle	Powerpoint Whiteboard doscussion	exam
3	4	i	Uniformity of sprinkler water distribution	Powerpoint Whiteboard doscussion	H.W
4	4	i&ii	Alternate setting of sprinkler laterals Sprinkler spray losses sprinkler irrigation efficiency	Powerpoint Whiteboard doscussion	exam

5	4	i&ii	Sprinkler lateral pipes Fundamentals of flow hydraulic pipes Allowable pressure variation /Sprinkler pipe size	Powerpoint Whiteboard doscussion	exam
6	4	ii	Friction head loss/Layout of sprinkler pipes Moving and operation sprinkler pipes Sprinkler pipe material	Powerpoint Whiteboard doscussion	exam
7	4	ii	Sprinkler irrigation major pipes distribution system Types of major pipes distribution system Design requirements/ Distribution system layout	Powerpoint Whiteboard doscussion	H.W
8	4	ii	Design methods (flow velocity method, allowable friction meth economic analysis method)	Powerpoint Whiteboard doscussion	exam
9	4	ii	Economic analysis general procedure Total dynamic head	Powerpoint Whiteboard doscussion	exam
10	4	vi	Applications on design of main pipe systems	Powerpoint Whiteboard doscussion	exam
11	4	ii	Trickle irrigation Advantages and problems of drip irrigation Trickle system basic component Soil-water-crop factors	Powerpoint Whiteboard doscussion	H.W
12	4	i&ii	Emitters selection/Hydraulic of trickle network	Powerpoint Whiteboard doscussion	exam
13	4	vi	General notes about evaluation of on- farm irrigation systems	Powerpoint Whiteboard doscussion	H.W
14	4	vi	Applications of Drip Irrigations	Powerpoint Whiteboard doscussion	exam
15	4	I,ii vi	Final Exam		Exam

11.Course Evaluation

Four Exams, (each 3pt)	12pt
Midterm Exam	20pt
Homework	8 pt
Final Exam	60pt
Total	100pt

12.Learning and Teaching Resources

Required textbo (curricular books, if any	On-farm irrigation systems engineering\by A.Y.Hachum, and H.I.Yasin. textbook- M University,1992.
Main references (source	Recahrd H. Cuenca Irrigation System Design: An Engineering Approach, 1989.
Recommended books and references (scientific journals, reports...)	
Electronic Referen Websites	https://www.youtube.com/channel/UCg_SvLC7LCRLmVtTAp yLA/videos

Course Description Form

1. Course Name:
Design of irrigation and drainage networks II
2. Course Code:
DWRE 411
3. Semester / Year:
second 2025-2026
4. Description Preparation Date:
16/10/2025
5. Available Attendance Forms:
Lectures and Tutorials
6. Number of Credit Hours (Total) / Number of Units (Total)
3 hr/2 cridits
7. Course administrator's name (mention all, if more than one name)
Name: Azza Nasralla Jaralla Al-Talib Email: a.altalib@uomosul.edu.iq Abdul Ghani Khalaf Muhammad alrobaai1982@uomosul.edu.iq
8. Course Objectives

Course Objectives	• **Inform students about design of lined canals ii** • **Inform students about design of drains ii** • **Lear drawing the longitudinal section for canals and drains i,ii** • **Lear drawing the cross section for canals and drains i,ii**
9. Teaching and Learning Strategies	
Strategy	The strategy is to provide theoretical lectures usi presentations and question solving in an interactive way with studer inside the classroom, as well as tutorials exercises.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Inform students about the design of line canals	Canal lining	Presentation And white board	Monthly exam
2	2	Inform students about the design of lin	Joints of lined canals	Presentation And white board	Monthly exam
3	2	Inform students about the design of lined canals	Hydraulic Design of lined canals	Presentation And white board	Monthly exam
4&5	4	Inform students about the design of lined canals	Corner trapezoidal section	Presentation And white board	Monthly exam
6	2	Inform students about drains	types of drians	Presentation And white	Monthly Exam

				board	
7	2	First monthly exam			
8&9	4	Inform students about drains	Design of open drains	Presentation And white board	Monthly Exam
10&11	2	Learn drawing the long section for canals and drains	Longitudinal section	white board	Monthly Exam
12&13	2	Lear drawing the cross-section for canals and drains	Cross section	white board	Monthly Exam
14	2	Lear drawing the cross section for canals and drains	Calculate cut and Fill quantities	white board	Monthly Exam
15	2	Second monthly exam			

11.Course Evaluation

Evaluation type	**degree**
First monthly exam	20
Second monthly exam	20
Final exam	60
total	100

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	Design Manual for Irrigation and Drainage, Pencol Engineering Consultants, London
Main references (sources)	Theory and Design of irrigation structures (vol.1 Varshney,R.S. ,Gupta,S.C. and Gupta, R. NEMCHANI BROS, ROORKEE,INDIA,1977
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://uclouvain.be/en-cours-2023-lbres2104

Course Description Form

1. Course Name:
Estimation and engineering specifications II
2. Course Code:
DWRE404
3. Semester / Year:
2/2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Theoretical lectures in class and lectures in the lab
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 A. khatta Email: m.almukhttar@uomosul.edu.iq

8. Course Objectives

Course Objectives	In ENDWR404, initially students will learn how to estimation the quantities of materials for buildings and Earth works calculations for irregular cross-sections structural in additional structural drawing Upon successful completion of this course the student shall be able to: 1. Structural Buildings ii 2. Understanding Foundation Types, with a Focus on Strip and Mat Foundations i 3. Analysis of Reinforced Ceilings and Reinforced Bridges ii 4. Retaining Walls ii 5. Water Tanks ii 6. Hydraulic Structures ii 7. Canals ii 8. Design and Drawing (Structural Building Map + Foundation Map + Columns) ii 9. Retaining Walls ii 10. Tanks ii 11. Steel Structures (Frames) ii 12. Hydraulic Structures ii

9. Teaching and Learning Strategies

Strategy	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 some challenging problems to motivate students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Knowing the types of buildings ((ii	Introduction to structural buildings, drawing (structural building plan).	Theoretical lecture in class and lecture in the lab	HW
2	3	Estimating the quantities of earthworks. (i) Design and drawing (base map + wall section) ((ii	Foundation Excavation Excavating strip and mat foundations, drawing (elevation view, sectional elevation view, foundation plan view, wall section).	Theoretical lecture in class and lecture in the lab	HW
3-4	6	Knowing the types of foundations and focusing on strip and mat foundations. (i)	Foundations Estimating (cement, sand, and gravel) for strip and raft foundations Estimating the quantity of reinforcing steel for	Theoretical lectures in class and lectures in the lab	HW & Exam

			strip and raft foundations. Drawing a reinforcement diagram.		
5	3	Analysis of Reinforced Ceilings ii Analysis of Reinforced Bridges ii Design and Drawing (Ceiling Reinforcement Map) ii Design and Drawing (Bridge Reinforcement Map) ii	Estimating materials required for reinforced ceilings. Estimating materials for bridges and drawing (reinforcement diagram).	Theoretical lectures in class	HW
6-8	6	Retaining walls ii	Estimating the materials needed for the work and drawing a painting on the subject	Theoretical lectures in class	HW & Exam
9-10	6	Tanks ii	Estimating the materials needed for the work and drawing a painting on the subject	Theoretical lectures in class	HW & Exam
11-13	6	Steel structures ii	Estimating the materials needed for the work and drawing a painting on the subject	Theoretical lectures in class and lectures in the lab	HW
14-15	6	Hydraulic structures ii	Estimating the materials needed for the work and drawing a painting on the subject	Theoretical lectures in class	HW

11.Course Evaluation

Evaluation type	**Degree**
H W & Sheets (each 1 pt)	10
Two Monthly exam(each 10 pt)	20
Midterm Exam	20
Final Exam	50
Total	100

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	• VANZIRANI, V.N., CHANDOLA, S.P. "Civil Engineering Estimating and Costing ". first edition, 1982.
Main references (sources)	• Civil Engineering and Costing, S.P. Mahajan, 624. 1042, M214. • 3. Estimating Building and Construction, 692.5, H816, 73-119.
Recommended books and references (scientific journals, reports...)	----------
Electronic References, Websites	----------

Course Description Form

1. Course Name:
Engineering Management
2. Course Code:
DWRE 413
3. Semester / Year:
2/2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Theoretical lectures 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. Rasha M. Sami Fadhil Email: Rasha.Fadhil@uomosul.edu.iq
8. Course Objectives

Course Objectives	**On successful completion of this course students will be able to:** **(a) effectively plan, organize, schedule, execute, and lead engineering management-related projects using virtual project teams;(ii)** **(b) Understand the importance of risk, cost, schedule and resource control and management of a projectlearn, (ii)** **(c) use project management software; (i)** **(d) assess team, team member, and project performance (i)**

9. Teaching and Learning Strategies	
Strategy	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 some challenging problems to motivate students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	**What is a Project.** **Project Management.** (i)	Introduction of engineering management	Theoretical lectures in class	Exam
3-2	4	Contract Parties.,The Resident Engineer. **Contract Documents.** Safety and Risk. Construction Project Management System. Project Planning. (i)	Defines and important of engineering management	Theoretical lectures in class	Exam
5-4	4	Bar chart method (Gantt Chart). Network Analysis Method (Critical Path Method(ii)	Techniques for Planning and Scheduling	Theoretical lectures in class	Exam

7-6	4	Activity on arrowAOA Activity on node AON(ii)	Techniques for Planning and Scheduling	Theoretical lectures in class	Exam
8	2	Monthly Exam			
10-9	4	Resources alloction , Line of balance(LOB) (ii)	Techniques for Planning and Scheduling	Theoretical lectures in class	Exam
11-12	4	Program Evaluation Review Technique (PERT) (ii)	Methods of Project Scheduling	Theoretical lectures in class	Exam
14-13	4	Crashing project (i) And fast -Ttracking	Project management	Theoretical lectures in class	Exam
15	2	Term Exam			

11.Course Evaluation

Evaluation type	**Degree**
2 homework	20
Term exam	20
Final exam	60
Total	100

12.Learning and Teaching Resources

Required textbooks (curricular books, if any)	----------
Main references (sources)	Primavera P6 for Project Management
Recommended books and references (scientific journals, reports...)	----------
Electronic References, Websites	----------

Course Description Form

1. Course Name:

Dams Engineering 2

2. Course Code:

DWRE 414

3. Semester / Year:

Spring semester / 2025-2026

4. Description Preparation Date:

1/9/2025

5. Available Attendance Forms:

Theoretical lectures in class

6. Number of Credit Hours (Total) / Number of Units (Total)

2/4

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Saher Sameer Email: s.alhilali@uomosul.edu.iq
Name: Dr. Saher Sameer Email: aliabdulmawjood@uomosul.edu.iq

8. Course Objectives

Course Objectives	• Formulate a preliminary design of an earth dam. • An ability to specify the problems of seepage through the

	body of an earth dams. • An ability to specify the problems of seepage through the • foundation of an earth dams.

9. Teaching and Learning Strategies

Strategy	The fourth-class students should be awareness about earth and rock fill dams. In addition, to give the students the knowledge about the modes of failure in earth dams, design consideration of an earth dams, seepage control through the body of the dam, and seepage control through the foundation. Component of spillways, types of, and design spillways are explained during this course.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	Earth and Rock fill Dam	rth and Rock fill Dams	Theoretical lectu in class	Exame
1	2	Earth and Rock fill Dam (Foundation for earth da Suit available materials)	Earth and Rock fill Dams	Theoretical lectu in class	Exame
1	2	Earth and Rock fill Dam (Modes of failure in ear dams)	Earth and Rock fill Dams	Theoretical lectu in class	Exame
1	2	Earth and Rock fill Dam (Location of a phreatic line)	Location of a phreatic line	Theoretical lectu in class	Exame
1	2	Earth and Rock fill Dams (Design Consideration of an Earth Dams)	Design Consideration	Theoretical lectu in class	HW and Exame
2	4	Earth and Rock Fill Dar (SEEPAGE CONTROL Seepage Control throug the body of the Dam)	SEEPAGE CONTROL	Theoretical lectu in class	Exame
2	4	Earth and Rock fill Dam (SEEPAGE CONTROL Seepage Control Throug the Foundation)	SEEPAGE CONTROL	Theoretical lectu in class	Exame
1	2	Earth and Rock fill Dam (Stability of Slopes)	Stability of Slopes	Theoretical lectu in class	HW and Exame
2	4	Earth and Rock fill Dam ((Swedish) Standard Method of Slices)	Stability of Slopes	Theoretical lectu in class	HW and Exame
1	2	Spillway (Component o spillways, Types of spillways)	Spillway	Theoretical lectu in class	Exame

11.Course Evaluation	
1 quizzes 10pts 2 homework 10pts Term Exam 20pts Final Exam 60pts Total 100pts	
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1. Hydraulics of Dams and Reservoirs, By: Fuat Senturk, Water Resources Publications, Colorado, U.S.A.,1994. 2. Theory and Design of Irrigation Structures, Vol. II, By: R. S. Varshney, S. C. Gupta and R. L. Gupta, Nem Chand & Bros, Roorkee (U.P.), India,1982. 3. Earth-Rock Dams, Engineering Problems of Design and Construction, By: J. L. Sherard, R. J. Woodward, S. F. Gizienske and W. A. Clevenger, John Wiley and Sons, Inc., New York, 1963. 4. Engineering for Dams, By: W. P. Greager, J. D. Justin and J. Hinds, In three Volumes, John Wiley and Sons, Inc., New York, 1961.
Recommended books and references (scientific journals, reports...)	Loucks, D. P., Van Beek, E., Stedinger, J. R., Dijkman, J. P., and Villars, M. T. (2005). Water Resources Systems Planning and Management: An Introduction to Methods, Models and Applications. Paris, UNESCO.

Course Description Form

1. Course Name:
Foundation Engineering II
2. Course Code:
DWRE 415
3. Semester / Year:
The second course/ 2025 -2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Class lectures + Electronic lectures
6. Number of Credit Hours (Total) / Number of Units (Total)
30 hours/ 2 credits
7. Course administrator's name (mention all, if more than one name)
Name: **Dr. Laith Khalil Ibrahim** Email: **laith.altaie@uomosul.edu.iq** **I. M. A. Al-kiki** Email: **i.alkiki@uomosul.edu.iq**
8. Course Objectives

Course Objectives	– **The optimal, good, economical and safe design of engineering pedestrian foundations (deep foundations) in terms of the student's familiarity with:** • **Types of piles foundations.** • **Bearing capacity of piles.** • **Analysis and distribution of stresses on piles.** – **Structural design of foundation.**

9. Teaching and Learning Strategies

Strategy	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 some challenging problems to motivate students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	**2**	**Defining the foundations of piles and knowing their types**	**Introduction and general information**	**Lecture in class**	**Class discussions**
2 + 3	**2**	**Knowledge of calculating the bearing capacity of the pile in clay soil**	**Bearing capacity of pile in clayey soil**	**Lecture in class**	**My class and homework assignment**
5 + 4	**4**	**Knowledge of calculating the bearing capacity of the pile in sandy soil**	**Bearing capacity of pile in sandy soil**	**Lecture in class**	**Daily exam**
6	**4**	**Knowledge of calculating the bearing capacity of pile groups**	**Bearing capacity of pile groups**	**Lecture in class**	**My class and homework assignment**
7	**2**	**Knowledge of calculating the bearing capacity of piles subjected to negative friction**	**Bearing capacity of piles subjected to negative friction**	**Lecture in class**	**Class discussions**
8 + 9	**4**	**Knowledge of calculating the bearing capacity of piles subjected to swell and tension force**	**Bearing capacity of piles subjected to swell and tension force**	**Lecture in class**	**Class discussions**
10	**2**	**Knowledge of calculating the bearing capacity of piles subjected to swell and tension force moment**	**Bearing capacity of piles subjected to moment**	**Lecture in class**	**First course examination No.1**
11	**2**	**Knowledge of structural design for (Single/separate foundations)**	**The structural design of foundations**	**Lecture in class**	**My class and homework assignment**
12	**2**	**Knowledge of structural design for (raft foundations)**	**The structural design of foundations**	**Lecture in class**	**Class discussions**
13	**2**	**Knowledge of structural design for (raft foundations)**	**The structural design of foundations**	**Lecture in class**	**Daily exam**
14	**2**	**Knowledge of structural design for (wall footing and foundations subjected to moment)**	**The structural design of foundations**	**Lecture in class**	**My class and homework assignment**
15	**2**	**Knowledge of structural design for (pile caps and reinforcement footing)**	**The structural design of foundations**	**Lecture in class**	**First course examination No.2**

11.Course Evaluation	
Evaluation type	**Degree**
Homework, classwork, reports (6)	6
Quizzes (2)	8
Term exam (2)	24
Final exam	60
Total	100
12.Learning and Teaching Resources	
Required textbooks (curricular books, if any)	- الشكرجي ، يوسف والمحمدي، نوري، " هندسة الأسس " ، جامعة بغداد ،الطبعة الاولى، 1985
Main references (sources)	-Das, B. M., "Principle of Foundation Engineering ", Thomson Books/Cole, California State University, Sacramento, 5th ed., 2004. - Peak, R. B., Hanson, W. E. and Thorburn, T.H., " Foundation Engineering ", John Wiley and Sons, 2nd ed., 1974 - Bowles, J.E., P.E., S.E." Foundation Analyses and Design ", The McGraw-Hill Companies, Inc, 5th ed., 2006. -Das, B. M., & Sivakugan, N.," Principles of foundation engineering", Cengage learning, 2018.
Recommended books and references (scientific journals, reports...)	18. Al-Rafidain Engineering Journal. 19. Highway Research Record , H R R. 20. Journal of the Geo technical engineering Division , ASCE. 21. Journal of Soil Mechanics and Foundation Division, Proc. ASCE. 22. Transportation Research Record , TRR. 23. Journal of the Japan Society of Civil Engineering , JSCE. 24. The Quarterly Journal of Engineering Geology.
Electronic References, Websites	None

Course Description Form

1. Course Name :
Applied Science
2. Course Code:
DWRE 417
3. Semester / Year:
Second/ 2025-2026
4. Description Preparation Date:
1/9/2025
5. Available Attendance Forms:
Theoretical lectures 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. Saleh Mohammed Saleh Email: s.zakaria@uomosul.edu.iq
8. Course Objectives

Course Objectives	• The aim of this course is to introduce the students to the area of Applied Science. The course will be presented in Arabic. The course will cover the principles of the Applied science focusing on the Fundamentals of each of Hydrochemistry , soil chemistry, Soil Physics, Surface Water Hydrology, as a main four chapters for the course of Applied Science. The course will include mathematical applications and calculations for each of the above chapters. This will enable students, in addition to the course's scientific methodology and hypotheses, to acquire a strong foundation in applied science concepts, providing a supporting background for engineering sciences in dealing with water and soil as both physical and chemical systems. This will be achieved through descriptive lectures and supervised tutorials
9. Teaching and Learning Strategies	
Strategy	• The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises in addition lectures, individual & group assignments, and e-learning platforms, while at the same time refining and expanding their critical thinking skills.

	• Applied science in chemistry, physics and surface water hydrology regarding soil and water resources involves the application of fundamental scientific principles to manage, conserve, and restore land and water quality for human and environmental needs. This interdisciplinary field combines soil chemistry (nutrient cycling, contaminant fate) and soil physics (water movement, soil structure) to address challenges like sustainable agriculture, pollution, and water scarcity. • This will be achieved through classes, interactive tutorials and by considering some challenging problems to motivate student

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1-3	6	Analyze the Molecular Structure of Water, Understand Polarity, Explain Hydrogen Bonding, Demonstrate Ion Stabilization (Hydration), Explain how the polarity of water allows it to act as an effective solvent, Relate Structure to Solubility	CHAPTER ONE I- Hydrochemistry A. Fundamentals of Aqueous Chemistry Introduction • polarity, • hydrogen bonding, and • ability to stabilize ions. B. Hydrogeochemical Processes C. Sources of Chemical Composition	Theoretical lecture in class	HW
4 - 8	10	Analyze the solid phase, Explain the soil solution, Ion classification: Define CEC, Factors influencing CEC, Understand the solubility of minerals and nutrient availability, Acid–base reactions, Identify	CHAPTER TWO - SOIL CHEMISTRY 1: Soil Chemical Composition	Theoretical lecture in class	HW

		reduction-oxidation processes , Explain the principles of cation and anion exchange and how plants take up nutrients, Understand the impact of soluble salts on soil physical and chemical properties. Interpret Electrical Conductivity and Total Dissolved Solids (TDS). Analyze Soil Salt Content (SSC) and its impact on osmotic potential and plant water uptake, Define Sodicity: Understand the effects of high sodium on soil structure (dispersion), Calculate SAR: Utilize the Sodium Adsorption Ratio to assess potential sodicity hazards. Calculate ESP: Determine the proportion of the CEC occupied by Sodium.	• Soil solid phase: minerals, organic matter • Soil solution: dissolved ions • Soil colloids and surface charge • Cations and anions in soil water • Some important Cation and Anion in the soil 2: Cation Exchange Capacity (CEC) 3: Soil Chemical Reactions • Dissolution and precipitation • Acid–base reactions • Oxidation–reduction • Ion exchange reactions 4: Soil Salinity • Soil salinity • Electrical Conductivity (EC) • Total Dissolved Solids (TDS) • Soil Salt Content (SSC) • Salt accumulation mechanisms 5: Sodicity and Sodium Adsorption Ratio (SAR) 6: Exchangeable Sodium Percentage (ESP)		

9-12	8	Define soil physics and its role in understanding the solid, liquid, and gaseous phases of the soil system, Describe soil as a three-phase system composed of solids (minerals/organic matter), liquid (water/solutes), and gas (air). Identify and differentiate between soil profile horizons (O, A, B, C, R) and their physical significance. Define soil constituents and explain the significance of particle size distribution (sand, silt, clay) in determining soil behavior. Determine soil texture class, Define soil structure, Distinguish between particle density and bulk density , including calculation methods for both. Calculate total porosity and identify factors affecting it. Differentiate between macro-porosity (drainage/aeration) and micro-porosity (water retention). Explain the concept of soil water potential and its components (matric, gravitational, pressure, osmotic). Define and calculate soil moisture constants, including saturation, field capacity, permanent wilting point, and plant-available water. Interpret the soil water characteristic curve (relationship between matric potential and water	1. Introduction to Soil Physics Scope and importance of soil physics Role in agriculture, ecology, and environmental science 2. Soil as a Physical System Soil phases (solid, liquid, gaseous) Soil profile and horizons Soil constituents and particle size distribution 3. Soil Texture and Structure Soil texture and textural classes Soil structure: types, formation, and stability Aggregation and pore arrangement 4. Soil Density and Porosity Particle density and bulk density Total porosity Macro- and micro-porosity 5. Soil Water Forms of soil water Soil water potential and its components Soil moisture constants 6. Soil Water Retention & Movement Soil water characteristic curve Infiltration Percolation and drainage Hydraulic conductivity,	Theoretical lectures in class	H W & Exam

		content).Describe Darcy's Law and calculate hydraulic conductivity for both saturated and unsaturated flow.			
13-15	6	Thiessen Polygon Method, Isohyetal Method, Apply methods to real-world rainfall data, compare results, and select the appropriate method based on topographic complexity and gauge density. Understand Infiltration Processes: Define infiltration, infiltration capacity, and the factors affecting it (soil type, moisture content, cover). Horton Model (Empirical), Green-Ampt Model (Physically Based), Apply the Green-Ampt equation for calculating cumulative infiltration and infiltration rate, accounting for soil hydraulic conductivity, suction head, and moisture deficit. Application: Compute infiltration losses from a hyetograph using both models to determine excess rainfall for runoff calculations. Understand Runoff Processes: Identify the components of runoff (surface, subsurface, baseflow) and the factors influencing the rainfall-runoff relationship. Rational Method, SCS Curve Number (CN) Method: Calculate volume of direct runoff using the SCS-CN empirical method,	CHAPTER FOUR IV- Surface Water Hydrology The hydrological cycle 1: Precipitation Analysis Precipitation Analysis as an Applied Science Method of estimating average rainfall 1- Thiessen polygon method 2- Isohyetal method EXAMPLES 2: Infiltration • Infiltration • Green-Ampt model (physically based) and • Horton model (empirical). EXAMPLES 3: Runoff Estimation How Runoff Estimation Works Runoff Estimation Methods	Theoretical lectures in class	HW

		determining curve numbers based on land use, hydrologic soil groups, and antecedent moisture conditions (AMC). Develop a unit hydrograph to estimate the watershed response to a storm event, understand its assumptions (linearity/time invariance), and apply synthetic UH methods (e.g., Snyder or SCS). Application: Compute runoff volumes, peak flows, and timing for specific storm events using all three methods and compare their applicability.	Rational Method Soil Conservation Service (SCS) Curve Number (CN) Method The Unit Hydrograph (UH) method EXAMPLES 4:Watershed Characteristics & Water Balance Watershed Characteristics Watershed Parameters Water Balance		
15	30				

11. Course Evaluation

Evaluation type	**degree**
Class Work OR Report	10
Quiz	10
Monthly Exam	20
mid	10
Final Exam	50
Total	100

12. Learning and Teaching Resources

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United States of America on acid-free paper International Standard Book Number-13: 978-1-77188-515-7 (Hardcover) International Standard Book Number-13: 978-1-315-36562-6 (eBook)	
Pravin Nilkanth Bendle, Rakesh Kumar Yadav, Sujata F Harlapur, Aparna B Dhote, 2023, Published by Rest Publishers Ltd, India. Edition: First Edition, FUNDAMENTALS OF APPLIED CHEMISTRY, Printed in India. ISBN : 978-81-967314-0-3	
pplied Physics, 11th edition Published by Pearson (October 25, 2024) © 2025 Dale Ewen, Neill Schurter, P Erik Gundersen	
وارد، روي س.، ومارك روبنسون. مبادئ علم المياه. المجلد ٣٦٧. لندن: ماكجرو هيل، ١٩٧٥.	
راغوناث، هـ. م. (٢٠٠٦). علم المياه: المبادئ والتحليل والتصميم. نيو إيج إنترناشونال.	
https://books.gw-project.org/groundwater-resource-development/part/references/	