

First Level / Bologna System

Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)					Senn (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)								
1	1	DWRE 111	Mathematics I	الرياضيات I	English	3	1				2	3	93	82	175	7.00	B	
	2	DWRE 112	Engineering Mechanics I	الميكانيك الهندسي I	English	2	1				2	3	78	72	150	6.00	B	
	3	DWRE 113	Engineering Drawing	الرسم الهندسي I	English				6			3	93	67	150	6.00	B	
	4	UOM 1011	Arabic 1	اللغة العربية ١	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 ١	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	21	441	309	750	30.00		
2	1	DWRE 121	Mathematics II	الرياضيات II	English	3	1					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	67	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	لغة الانكليزية ١	English	2						3	33	17	50	2.00	S	
Total Weekly Hours						27	11	2	8	0	6	21	426	324	750	30.00		

Course Description Form

1. Course Name:					
Mathematics I					
2. Course Code:					
DWRE 111					
3. Semester / Year:					
1 ST / 2026-2027					
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, Indefinite integral, Integration by substitution, The definite integral, Evaluating definite integrals by substitution, Applications of the definite integral, Area between two curves, Volumes by slicing; disks and washers, 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 shells	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 revolution	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	-----

1. Course Name:					
Engineering mechanics I					
2. Course Code:					
DWRE 111					
3. Semester / Year:					
1 ST / 2026–2027					
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: Asst. Prof. Mohammed tariq Mahmood Email: m.altaiee@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 force system and resultant.	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	-----

1. Course Name:	
Engineering Drawing	
2. Course Code:	
DWRE 113	
3. Semester / Year:	
1 ST / 2026–2027	
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: ahmed.abdal- hameed@uomosul.edu.iq	
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 / 2026-2027
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 (إذا أكثر من اسم يذكر)
المدرس : أ.م.د. خالد الشمري
8. اهداف المقرر
- التعرف على أساسيات قواعد اللغة العربية - اكتساب الطالب المهارة في الكتابة العربية من تصحيح الأخطاء الواردة في الكتابة ومعرفة القواعد النحوية والاملائية التي تصون 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 والواجبات.

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 وتقاير	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
2	2	A4 : أ يفرق الطالب بين همزتين القطع والوصل في الفظ والكتابة	النطق ب همزة 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 الاسمية	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 والنكرة	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					
الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل	محاضرات	الأخطاء اللغوية	B2 : ان يظهر الفرق بين الأخطاء الإملائية والأخطاء اللغوية في الكتابة	2	11
الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب	محاضرات	الأفعال الناقصة	A2 : أن يشرح الطالب الأفعال الناقصة والتغير الذي يحدث على الجملة الاسمية بدخولها عليها	2	12
الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب	محاضرات	النطق كتابة الضاد والطاء	C7: ان يبين الفرق بالنطق بين حرفين الضاد والطاء	2	13
الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب	محاضرات	التغاير الصرفي	A2 : ان يصنف الطالب الفرق بين المنقوص والمقصور والممدود	2	14
واجب بيتي	محاضرات	الشعر وأنواعه	B8 : يكتب نبذة عن عناصر الشعر	2	15
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					
النحو الوافي - عباس حسن			الكتب المقررة المطلوبة (المنهجية أن وجدت)		
كتاب النحو المبسط، للشيخ ادهم العاسمي			المراجع الرئيسية (المصادر)		
لا يوجد			الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)		
لا يوجد			المراجع الإلكترونية، مواقع الانترنت		

1. Course Name:					
Introduction to Water Resources Engineering					
2. Course Code:					
DWRE 114					
3. Semester / Year:					
1 ST / 2026–2027					
4. Description Preparation Date:					
8/4/2025					
5. Available Attendance Forms:					
A theoretical lecture in the classroom					
6. Number of Credit Hours (Total) / Number of Units (Total)					
15 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 Iraq/Control and storage projects/Executed large dams.	Theoretical lecture in the classroom	Quizzes in the fifth week
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
quizzes	15
homework	15
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

1. Course Name:					
Computer 1					
2. Course Code:					
UOM 1031					
3. Semester / Year:					
1 ST / 2026–2027					
4. Description Preparation Date:					
1/6/2025					
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					
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	Exam and CW

				lectures in lab.	
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 lectures in lab.	CW
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		

1. Course Name:	
geology	
2. Course Code:	
DWRE 117	
3. Semester / Year:	
1 ST / 2026–2027	
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: Lect. Doc. Abdulaziz Abdulbasit	
Email : Abdul Azeez.mohammed@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 concept of water budget	Rock properties affecting groundwater	Theoretical lectures in class	Discuss reports
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 BEGINNING 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	-----

1. Course Name:					
Mathematics II					
2. Course Code:					
DWRE 121					
3. Semester / Year:					
1 ST / 2026-2027					
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 invol logarithmic and exponential functions, Graphs and applications involving logarithmic and exponer functions, Hyperbolic functions, Hopital's Rule, An overview of integration methods: Trigonome 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 integration methods: Trigonometric substitutions, Trigonometric integral, Integration by parts, Integrating rational functions by partial fractions, Numerical 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	-----

1. Course Name:					
Engineering mechanics 2					
2. Course Code:					
DWRE 122					
3. Semester / Year:					
2 nd / 2026-2027					
4. Description Preparation Date:					
1/9/2025					
5. -Available Attendance Forms:					
Theoretical lectures in class					
r of Credit Hours (Total) / Number of Units (Total)					
4/6					
6. Course administrator's name (mention all, if more than one name)					
Name: Asst. Prof. Mohammed tariq Mahmood					
Email: m.altaiee@uomosul.edu.iq					
7. 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.				
8. 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.				
9. 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 moment of inertia (Mohr circuit)	Theoretical lectures in class	HW & Exam
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	-

10. Course Evaluation

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

11. 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	-----

1. Course Name:	
Computer Drawing	
2. Course Code:	
DWRE 123	
3. Semester / Year:	
2 nd / 2026-2027	
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	
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	Drawing Commands: Text, Mtext	A lecture in the lab	CW & HW

		commands (Continued)			
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

1. Course Name:	
Statistics	
2. Course Code:	
DWRE124	
3. Semester / Year:	
2 nd / 2026-2027	
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 components to 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	-----

1. Course Name:
Chemistry
2. Course Code:
DWRE 125
3. Semester / Year:
2 nd / 2026-2027
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. Sahar Samir Younis Email: s.alhilali @uomosul.edu.iq Name : Asst.Lect. Ahmed Abdulhameed Ahmed Alkattan Email: ahmed.abdal-hameed@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.
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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.
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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	Effect of decomposition rate (decomposition constant) on the	Theoretical lectures and labrotory	Daily exam + practical experience report

		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)	amount of oxygen required in the process of waste decomposition Lab 3: PH-value Electrical Conductivity.		
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 laboratory	practical experience report
8	3		Mid-term Exam Lab 4: Electrical conductivity	Theoretical lectures and laboratory	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 laboratory	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	Study the type of pollution on the river. Lab 6: Dissolved Oxygen	Theoretical lectures and labrotory	Practical experience report

		effect of low oxygen on aquatic organisms (iii)			
15	3	Identifying the causes of pollution and finding appropriate solutions to solve the pollution problem (iii)	Wastewater treatment.	Theoretical lectures and labrotory	Practical experience report
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	-----

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: Dr. Adrees Hader Hyshan					
8. Course Objectives					
-Understanding, knowing, and realizing the rights that God Almighty has granted to all human beings. They are a gift, not a gain for anyone, and no one has the right to take them away. - The student expresses and defends these rights in his own way - Explaining phenomena and giving explanations for the violations of rights that occur before him - Identifying deficiencies and gaps in light of the information available in 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 classroom • Homework			
10. Course Structure					
Evaluation method	Learning method	Name of the unit or topic	Required learning outcomes	hours	week
	Theoretical lecture	Introduction/The concept of human rights	The student should know and	2	1

			introduction to rights(v)		
	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	2	10

			rights in the Christian religion(v)		
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 and freedoms	The student should enumerate modern trends rights and freedom (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 (curriculum 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
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1. Course Name:					
English I					
2. Course Code:					
UOM 1021					
3. Semester / Year:					
2 nd / 2026-2027					
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	Unit 1 : A world of difference: Tenses * Auxiliary verbs * What's	Theoretical lecture in class	HW

		literacy: writing, speaking, reading and listening.	in a word? Everyday situations		
2	2	Students will heighten their awareness of correct usage of English grammar in writing and speaking.	Starter : Tenses and auxiliary verbs, Each question has one word missing. Write it in, T 1.1 Listen and check your answers, GRAMMAR SPOT, Write your own quiz,	Theoretical lecture in class	HW
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 and a 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 Kamas 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	Theoretical lectures in class	HW

			and check, Talking about you, Dave Telford police officer and surfer		
8	2	the students will attain and enhance competence in the four modes of literacy: writing, speaking, reading and listening.	Simple and continuous T 2.5 Listen to two people talking about who's who in The Office. What are their names? What are their jobs?, Work with a partner. Read the conversation aloud.	Theoretical lectures in class	Midterm Exam
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, inent Van Gogh, the genius unrecognized in his own lifetime, GRAMMAR SPOT: In	Theoretical lectures in class	HW

			these sentences, which verb form is ...? Past Simple Past Continuous Past Simple passive,		
14	2	Students will enlarge their vocabulary.	Pronunciation, practice , didn't do much, Discussing grammar, A 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,	Theoretical lectures in class	HW
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	-----

Second Level / Bologna System

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semr (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code	
3		1	DVRE 211	Mathematics III	الرياضيات III	English	2				2		3	63	62	125	5.00	B		
		2	DVRE 212	Fluid Mechanics I	ميكانيك الموائع I	English	2		2				3	93	57	150	6.00	C		
		3	DVRE 213	Strength of Materials	مقاومة المواد	English	2	1			2		3	78	72	150	6.00	B		
		4	DVRE 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	DVRE 218	Building Construction	البناء المباني	Arabic	2		2				3	63	37	100	4.00	C		
		7	UOM 2012	Arabic 2	اللغة العربية ٢	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		
UGII																				

Course Description Form

1. Course Name:	
Mathematics III	
2. Course Code:	
DWRE 211	
3. Semester / Year:	
1 st / 2026-2027	
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.
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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	_____

1. Course Name:
Fluid Mechanics 1
2. Course Code:
DWRE 212
3. Semester / Year:
1 st / 2026-2027
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 credits

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 water resources engineering department that from this subject student will learn and practice to find properties (units and dimensions, Density, Specific weight, Viscosity, Surface tension, Capillarity, Fluid static (pressure–density–height relationships). Absolute pressure and gauge pressure, types of pressure gages. Force on submerged plane surfaces. Force on submerged curved surfaces. Applied problem about gates, damsetc. Stability of submerged and floating bodies. This achieved by theoretical lectures.				
9. Teaching and Learning Strategies					
Strategy	The strategy is to provide theoretical lectures using presentation 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 Dimensions, Density, Specific weight,	Fluid properties – Units and Dimensions, Density, Specific weight,	Presentation And white board	Monthly exam
3	2	Compressibility, Elasticity. Surface tension, Capillarity	Compressibility, Elasticity. Viscosity, Surface tension, Capillarity	Presentation And white board	Monthly exam
4&5	4	Fluid static (pressure–density relationships).	Fluid static (pressure–density–height relationships).	Presentation And white board	Monthly exam
6	2	Fluid static (pressure–density relationships).	Fluid static (pressure–density–height relationships)	Presentation And white board	Monthly Exam
7	2	exam			
8&9	4	Absolute pressure and gauge types of pressure gages	Absolute pressure and gauge types of pressure gages	Presentation And white board	Monthly Exam
10	2	Force on submerged plane surfaces	Force on submerged plane surfaces.	white board	Monthly Exam
11	2	Stability of submerged and floating bodies.	Stability of submerged and floating bodies.	white board	Monthly Exam
12	2	Applied problem about gates, damsetc.	Applied problem about gates, damsetc.	white board	Monthly Exam
13	2	Applied problems on submerged and floating bodies	Applied problems on submerged and 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 orifice 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. <i>A textbook of fluid mechanics hydraulic machines</i> . S. Chand Publishing.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://uclouvain.be/en-cours-2023-lbres2104

1. Course Name:	
Strength of Material	
2. Course Code:	
DWRE213	
3. Semester / Year:	
1 st / 2026-2027	
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.
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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).
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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	-----

1. Course Name:	
Surveying	
2. Course Code:	
DWRE 214	
3. Semester / Year:	
1 st / 2026-2027	
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.agma@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 obstacle 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 the Reciprocal leveling, Determine Contour Interval and Contour Line Values, determine level of the sewer, and computation of area (regular and irregular figures) by using different 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.
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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 accumulation 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 a staff reading by Rise and fall method (i) .	Procedure in levelling, Rise and fall method,	Lectures on theory 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 collimation 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 square Radiating lines, Diagonal 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 Refraction 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 integration the planimeter, Areas enclosed by straight lines , and Irregular 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	

1. Course Name:	
Computer II	
2. Course Code:	
UOM 2032	
3. Semester / Year:	
1 st / 2026-2027	
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:. Mays Ibrahim Hasan Email: mays.ibrahim.alsaidi@uomosul.edu.iq Name : Surra hussein Abdulmajeed Email: Surra.hussein@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 and 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 and 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 virtual assistants like Siri or Google 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 virtual assistants like Siri or Google 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 AI affects social, AI and international relations, AI and the future of humanity.)	A practical lecture conducted in the laboratory.	
13	3	Ethical Challenges in AI:	(AI ethics, privacy and surveillance, the impact of AI 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 AI, recent 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). الخضر على الخضر بحث " أساسيات الحاسوب 4 2016 الدكتور عادل عبد النور, "مدخل إلى عالم الذكاء الاصطناعي" 5 2005
Electronic References, Websites	

1. Course Name:	
Building construction	
2. Course Code:	
DWRE 216	
3. Semester / Year:	
1 st / 2026-2027	
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)
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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:
Arabic Language2
2. رمز المقرر:
UOM 2012
3. الفصل / السنة:
الاول / 2025-2026
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 (إذا أكثر من اسم يذكر)
المدرس : م.د. خالد الشمري
8. اهداف المقرر
- التعرف على أساسيات قواعد اللغة العربية - اكساب الطالب المهارة في الكتابة العربية من تصحيح الأخطاء الواردة في الكتابة ومعرفة القواعد النحوية والاملائية التي تصون 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 والواجبات.
10. بنية المقرر

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة / أو الموضوع	طريقة التعليم	طريقة التقييم
1	2	A1 : أن يعرف الطالب الكلمة ثم يذكر أقسامها (الاسم- والفعل - والحرف)	اللغة العربية / أقسام الكلمة وتعريفاتها	محاضرات وتقاير	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
2	2	A4 : أ يفرق الطالب بين همزتين القطع والوصل في اللفظ والكتابة	النطق ب همزة 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 : أن يميز الطالب ويبين الفرق بين المبني والمعرب وعلامات الأعراب الأصلية والفرعية	المبني والمعرب وعلامات الأعراب الأصلية والفرعية	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
7	2	A2 : أن يفهم الطالب الجزئين الرئيسيين للجملة الاسمية وهما المبتدأ والخبر	الجملة الاسمية	محاضرات	الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب
8	2	C1 : أن 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 : أن يميز الطالب بين الاعداد المعربة والاعداد المبنية ويميز كذلك بين العرفة والنكرة	احكام العدد من حيث الاعراب والبناء ومن حيث التعريف والتنكير	حل تمارين	اختبار شفهي
10	2	A1 : أن يعرف الطالب اهمية علامات الترقيم في الكتابة	علامات الترقيم	محاضرات	الامتحانات اليومية، الواجبات،

النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب					
الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل	محاضرات	الأخطاء اللغوية	B2 : ان يظهر الفرق بين الأخطاء الإملائية والأخطاء اللغوية في الكتابة	2	11
الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب	محاضرات	الأفعال الناقصة	A2 : أن يشرح الطالب الأفعال الناقصة والتغير الذي يحدث على الجملة الاسمية بدخولها عليها	2	12
الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب	محاضرات	النطق كتابة الضاد والظاء	C7: ان يبين الفرق بالنطق بين حرفين الضاد والظاء	2	13
الامتحانات اليومية، الواجبات، النقاش وحل التمارين داخل المحاضرة، تفاعل الطالب	محاضرات	التعابير الصريفي	A2 : ان يصنف الطالب الفرق بين المنقوص والمقصور والممدود	2	14
واجب بيتي	محاضرات	الشعر وأنواعه	B8 : يكتب نبذة عن عناصر الشعر	2	15

11. تقييم المقرر	
الحضور 1% الواجبات 4% اختبارات قصيرة (Quiz) 5% (الأسبوع الثالث، الأسبوع الخامس، الأسبوع السابع، الأسبوع التاسع، الأسبوع الحادي عشر) امتحان فصلي اول 15% (الأسبوع السادس) امتحان فصلي ثاني 15% (الأسبوع الرابع عشر) درجة السعي 40% الامتحان نهائي 60 % الدرجة النهائية 100%	
12. مصادر التعلم والتدريس	
النحو الوافي - عباس حسن	الكتب المقررة المطلوبة (المنهجية أن وجدت)
كتاب النحو المبسط، للشيخ ادهم العاسمي	المراجع الرئيسية (المصادر)
لا يوجد	الكتب والمراجع الساندة التي يوصى بها (المجلات العلمية، التقارير....)
لا يوجد	المراجع الإلكترونية، مواقع الانترنت

1. Course Name:					
Differential Equations					
2. Course Code:					
DWRE 221					
3. Semester / Year:					
2 nd / 2026-2027					
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 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 concepts of Laplace Transform	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	

1. Course Name:					
Fluid Mechanics II					
2. Course Code:					
DWRE 222					
3. Semester / Year:					
2 nd / 2026-2027					
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 credits					
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	continuity	Presentation	Monthly

		equation and conversation of mass principle	equation and conversation of mass principle with applications	And white board	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 meter and applications	Venturi meter	Presentation And white board	Monthly Exam
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	Discharge	Laboratory	Experimental

		Measurements in Pipes by Vanturi Meter	Measurements in Pipes by Vanturi Meter	experiments	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 6 th ed. 1981
Main references (sources)	Fluid mechanic and Hydraulic machines By: Bansal 9 th ed. 2010
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://uclouvain.be/en-cours-2023-lbres2104

1. Course Name:
Structures
2. Course Code:
DWRE223
3. Semester / Year:
2 nd / 2026-2027
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. Mohammed M. Khalaf Email:

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.
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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.
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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	-----

1. Course Name:
Areas and Volumes
2. Course Code:
DWRE 224
3. Semester / Year:
2 nd / 2026-2027
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.agma@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 volume from contour maps, bearing of lines, designation of bearing, theodolite, construction adjustment of the theodolite, measurement of angles, traverse surveys and their adjustment, 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 part fill, Section of variable level (three level section), Multi-level 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, n areas, end areas, Prismoid 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 pyramid 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 Borrow pit) 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, Bearing Designation of Bearing		Mid-term Exam
9	5	Learn how to calculate back bearing from angles(i) .	Deflection angle, Fore Back Bearings. Calculation 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 angles from included angles, Quiz 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 traverse surveying, Traverse computations, Latitudes and departure.	Lectures on theory conducted in the classroom.	
12	5	Correcting angles and lengths of sides using various methods (iii).	Closing error, Graphical adjustment, bowditch's rule 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 principle Determine the stadia intercept 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 principle , 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	

1. Course Name:
Physics and Soil Science
2. Course Code:
DWRE 225
3. Semester / Year:
2 nd / 2026-2027
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: Abdulghani khalaf Mohammed Email: 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 soil	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 and 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=

1. Course Name:					
English 2					
2. Course Code:					
UOM2022					
3. Semester / Year:					
2 nd / 2026-2027					
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. Saleh Mohammed Saleh Email: s.zakaria@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	Introductory 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, supporting details, and thesis statement	Supplement of main ideas	Lectures on theory conducted in the classroom.	
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

1. Course Name:	
Baath crimes in Iraq	
2. Course Code:	
UOM 2050	
3. Semester/Year:	
2 nd / 2026-2027	
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: Wissam Jamal	
Email: Wissam@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	- Educating students about the crimes committed by the Baath regime in Iraq - 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 their types	View Sfe minutes a contribution	Written lecture
second	2		Types of trinational crimes	=	=
third	2		Political crime Exam	=	=
fourth	2		Sociai Crime	=	=
fifth	2		The crime of suppressing the	=	=
sixth			Shaaban uprising		
			psychological	=	=

Seventh	2		crimes of the baath	=	=
Eighth	2		regime of disrupting Friday prayers	=	=
Ninth	2		Mass grave crimes	=	=
10 th	2		Chemical attack on Haiabja	=	=
Eleven	2		Use of internationally	=	=
twelfth	2			=	=
Thirteenth	2		Exam Environmental	=	=
Fourth	2		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 / Bologna System

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semr (hr/w)	Exam hr/sem	SSWL hr/sem	USSLW hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code	
5		1	DNRE 311	Hydraulics	هيدروليك	English	2				3		3	78	47	125	5.00	C		
		2	DNRE 312	Surface Water Hydrology	هيدرولوجي المياه السطحية	Arabic	2		2		1		3	78	47	125	5.00	C		
		3	DNRE 313	Irrigation Principles and Practices	اسس الري و عملياته	Arabic	2			1	1		3	63	37	100	4.00	C		
		4	DNRE 314	Concrete Design	تصميم خرسانة	English	3			1	2		3	93	82	175	7.00	S		
		5	DNRE 315	Principles of Soil Mechanics	مبادئ ميكانيك التربة	English	2		3		2		3	108	67	175	7.00	C		
		6	DNRE 316	Statistical Methods in Hydrology	الطرق الإحصائية في الهيدرولوجي	English	2				2		3	33	17	50	2.00	S		
Total Weekly Hours							29		13	0	5	2	9	0	18	453	297	750	30.00	
UGIII					اسم المادة الدراسية	Language	CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semr (hr/w)	Exam hr/sem	SSWL hr/sem	USSLW hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code	
	6	1	DNRE 321	Numerical Analysis	التحليلات العددية	English	3				2		3	78	72	150	6.00	C		
		2	DNRE 322	Open Channels	القنوات المفتوحة	English	2				3		3	78	47	125	5.00	C	DWRE 311	
		3	DNRE 323	Groundwater Hydrology	هيدرولوجي المياه الجوفية	Arabic	2		2		1		3	78	22	100	4.00	C		
		4	DNRE 324	Drainage Engineering	هندسة الصرف	Arabic	2		1		2		3	78	72	150	6.00	C		
		5	DNRE 325	Soil Mechanics and Foundations	ميكانيك التربة والاسس	English	2		2		2		3	93	32	125	5.00	C		
	6	DNRE 326	Consumptive Use and Water Duty	الاستهلاك المائي و القنات المائية	Arabic	2						3	33	17	50	2.00	C			
7	DNRE 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:					
1 st / 2026–2027					
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 credits					
7. Course administrator's name (mention all, if more than one name)					
Name: Prof. Ahmed Y. Mohammed; Email: a.altaee@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 presentation 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 applications	Modelling in pipes open channel	Lecture in class	HW & Quiz
3	2	Understand the flow in pipes types and what are their applications	Flow in pipes, general 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 rd smooth flow in pipe	Lecture in class	HW & Quiz
9	2	Discuss the usage of non-circular how to deal with them theor	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 fit 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 t of water supply system.	Hardy- cross method t discharge in each networks	Lecture in class	HW & Quiz
14	2	Discuss the various properties a 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 <i>textbook of fluid mechanics hydraulic machines</i> . S. Chand Publishing.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	https://uclouvain.be/en-cours-2023-lbres2104

1. Course Name :	
Surface water Hydrology	
2. Course Code:	
DWRE 312	
3. Semester / Year:	
1 st / 2026–2027	
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 Budget 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, Preparation 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 Rainfall, Depth- area-duration –Relationship, Depth-Area-Duration,	Theoretical lectures in class	HW

			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 Coefficient, 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 hydrological storage and channel.	Flood Routing, Hydrologic Storage	Theoretical lectures in class	HW

			Routing, Hydrologic Channel Routing.		
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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 introduction 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	Laboratory Computers	HW

			(Application Engineering Approach)		
14	2		Theoretical and practical exam.	Laboratory Comput	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 hydrology. Vol. 367. London: McGraw-Hill, 1975.	
Raghunath, H. M. (2006). Hydrology: principles, analysis, and design. New Age International.	

1. Course Name:	
Irrigation principles and practices	
2. Course Code:	
DWRE 313	
3. Semester / Year:	
1 st / 2026-2027	
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.
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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 - precipitation - flood water - ground water	Introducing the student to irrigation in general	Lecture	
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 -	rrigation water sources and storage	Lecture	H.W(2)and Dailyexam(2)

		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			
6	4	Monthly exam(1)			
7-8	8	Soil and soil basic relationships - soil texture - soil structure (soil construction) - specific gravity (real weight) - specific weight Pore space - leaching - soil water input - permeability - soil depth - plant food compounds - soluble excess salts	The basic relationships between soil and water	Lecture	H.W(3)and Daily exam(3)
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

1. Course Name:	
Concrete Design	
2. Course Code:	
DWRE 314	
3. Semester / Year:	
1 st / 2026-2027	
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	-----

1. Course Name:
Principles of Soil Mechanics
2. Course Code:
DWRE315
3. Semester / Year:
1 st / 2026-2027
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)
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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.
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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)	o Al-Asho, M. O "Soil Mechanics Principles", 1990 Student textbook, University of Mosul.
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Main references (sources)	- o - Das, B.M. and Sobhan, K. "Principle of Geotechnical Engineering", ninth Edition, Cengage Learning. - o 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 Civil Engineering, JSCE.
Electronic References, Websites	None

1. Course Name:	
Statistical Methods in Hydrology	
2. Course Code:	
DWRE 316	
3. Semester / Year:	
1 st / 2026-2027	
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
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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.
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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 Jerry 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	_____

1. Course Name:	
Numerical Analysis	
2. Course Code:	
DWRE 321	
3. Semester / Year:	
2 nd / 2026–2027	
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
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9. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encourage student participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes and interactive tutorials
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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:Gregory Newton 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	-----
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1. Course Name:					
open channels					
2. Course Code:					
DWRE 322					
3. Semester / Year:					
2 nd / 2026-2027					
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 credits					
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 typical 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, types and classifications	Presentation And white board	Monthly exam
2	2	Uniform flow, Chezy and Manning equations.	Uniform flow, Chezy and Manning equations.	Presentation And white board	Monthly exam
3	2	Best hydraulic cross section	Best hydraulic cross section	Presentation And white board	Monthly exam
4&5	4	Consecration of hydraulic radius and Manning coefficient	Consecration of hydraulic radius and Manning coefficient	Presentation And white board	Monthly exam
6	2	Specific energy and critical depth.	Specific energy and critical depth.	Presentation And white board	Monthly Exam
7	2	First monthly exam			
8&9	4	Critical depth with hydraulic contractions	Critical depth with hydraulic 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 profile	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. <i>A textbook of fluid mechanics hydraulic machines</i> . S. Chand Publishing.		
Recommended books and references (scientific journals, reports...)					
Electronic References, Websites			https://uclouvain.be/en-cours-2023-lbres2104		

1. Course Name:					
Groundwater Hydrology					
2. Course Code:					
DWR 323					
3. Semester / Year:					
2 nd / 2026-2027					
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 Unconfined aquifer, percolating aquifer, perched aquifer	Definitions and terms	Theoretical lectures in class	H.W.

		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	Computer Lab	Report

			well discharge, distribution, and groundwater flow		
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/

1. Course Name:	
Drainage Engineering	
2. Course Code:	
DWRE 324	
3. Semester / Year:	
2 nd / 2026–2027	
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: - Definition of drainage, its purpose, evidence and benefits, as well as an overview of the history of drainage in Iraq. - Learn the basics of groundwater movement by studying Darcy's law, Laplace's equation, and Dupuis-Forchheimer's equation. - Learn about the reclamation of saline soils, salts removal, and the requirements for washing them. - Learn the exploratory and design investigations of drainage projects. - Studying the various methods used to estimate the hydraulic conductivity of soils in the laboratory and field. - Identifying the different drainage systems through their types, planning their locations and depths, and designing filters. - Learn the basics of designing surface (open) and subsurface (covered) drainage sections. - 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 student 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	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 their types, planning their locations and depths, and designing filters.	Drainage systems	Theoretical lectures in class	HW & Exam
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. <i>Drainage Engineering</i> . Dar Al-Kutob for Printing and Publishing, University of Mosul, Mosul, Iraq, 1992.
Main references (sources)	• Luthin, James N., and James N. Luthin. <i>Drainage engineering</i>. No. TC970 L8. New York: Wiley, 1973. • Waller, Peter, and Muluneh Yitayew. <i>Irrigation and drainage engineering</i>. 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. <i>Arabian Journal of Geosciences</i> , 14, 1-14.
Electronic References, Websites	http://kcl.digimat.in/nptel/courses/video/126105010/L41.html

13. Course Name:
Soil Mechanics and Foundations
14. Course Code:
DWRE325
15. Semester / Year:
2 nd / 2026-2027
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 and its parameters and importance	Soil shear strength.	Lecture in class	Quiz
		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. - o Coduto, D.P. " Geotechnical Engineering Principle and practices", 1999, Prentice-Hall, Inc. - o
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 Civil Engineering, JSCE.
Electronic References, Websites	None

1. Course Name:	
Consumptive use and water duty	
2. Course Code:	
DWRE 326	
3. Semester / Year:	
2 nd / 2026-2027	
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 - Hargreaves equation - water consumption of natural plants,	Introducing the student to the importance of calculating plant water consumption	Lecture	
3-4	8	Find crop coefficient K _c for different plants and calculate water consumption of crop E _{Tc} , - 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 and 13	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			
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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 (curriculum 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 (pencil), 1980
Electronic References, Website	https://classroom.google.com/c/ODE1NzgxMTk4OTg4

1. Course Name:
Planning and Designing of Engineering Projects
2. Course Code:
DWRE 327
3. Semester / Year:
2 nd / 2026–2027
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 nature and characteristics of engineering projects, comprehend the engineering project life cycle and its different phases, and systematically analyze engineering problems to identify their 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 for engineering projects in terms of time, resources, and risks. The course also aims to introduce students to the specific characteristics of water resources engineering projects and their technical and environmental complexities, and to develop analytical thinking and engineering decision-making skills. This prepares graduates for effective participation in the planning and implementation of engineering projects. The course provides a suitable foundation for some postgraduate courses in project management and engineering.
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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.
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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 engineering projects and operational activities	Introduction to Engineering Projects and Their Characteristics	Theoretical Lectures	—
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 Design Methodology Alternatives Generation	Theoretical Lectures	Quiz (1)
6	2	Develop a Work Breakdown Structure (WBS) and decompose the project into manageable activities	Work Breakdown Structure (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 (CPM) 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 Water Resources Engineering 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, <i>PMBOK Guide</i>. - Chitkara, K. K., <i>Engineering Project Management</i>
Recommended books and references (scientific journals, reports...)	- Dym, C. L., <i>Engineering Design</i>. - Program Design and Planning Manual.
Electronic References, Websites	

Forth Level / Bolonga System

Level	Semester	No.	Module Code	Module Name in English	اسم الوحدة الدراسية	Language	CL (hr/w)	Leet (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semr (hr/w)	Exam hr/sem	SSWL hr/sem	USSL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code	
7		1	DWRE 411	Design of Hydraulic Structures I	تصميم المنشآت الهيدروليكية I	English	1			1	2		3	63	62	125	5.00	C		
		2	DWRE 412	Design of Gravity Irrigation Systems	تصميم منظومات الري السحيبي	English	2			1	2		3	78	72	150	6.00	C		
		3	DWRE 413	Design of Earth and Earth Rock Fill Dams	تصميم السدود الترابية والإعلالية	English				1	2		3	63	62	125	5.00	C		
		4	DWRE 414	Economic Science	علوم الاقتصاد	English	2				2		3	63	62	125	5.00	C		
		5	DWRE 415	Design of Irrigation and Drainage Networks	تصميم شبكات الري والزل	English	1			2	1		3	63	62	125	5.00	C		
		6	DWRE 416	Engineering Project I	المشروع الهندسي I	Arabic					2		3	33	17	50	2.00	C		
		7	DWRE 417	Sustainable water engineering	هندسة المياه المستدامة	Arabic	2						3	33	17	50	2.00	C		
							9	0	0	5	11	0	21	396	354	750	30.0			
Total Weekly Hours							25													
UGIV						Language														
Semester		No.	Module Code	Module Name in English	اسم الوحدة الدراسية	Language	CL (hr/w)	Leet (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semr (hr/w)	Exam hr/sem	SSWL hr/sem	USSL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code	
		1	DWRE 421	Design of Hydraulic Structures II	تصميم المنشآت الهيدروليكية II	English	1			2	2		3	78	72	150	6.00	C		
		2	DWRE 422	Design of Sprinkler and Drip Irrigation Systems	تصميم منظومات الري بالرش والتقطيط	English	1			1	2		3	63	62	125	5.00	C		
		3	DWRE 423	Design of Gravity and Arch Dams	تصميم السدود الجاذبية والقوسية	English	2				3		3	78	72	150	6.00	C		
		4	DWRE 424	Estimations and Specifications	التصميم والمواصفات	Arabic	2			2	2		3	93	82	175	7.00	S		
		5	DWRE 425	Water Supply Engineering	هندسة تجهيز المياه	Arabic	2						3	33	17	50	2.00	S		
		6	DWRE 426	Engineering Project II	المشروع الهندسي II	Arabic					2		3	33	17	50	2.00	C	DWRE 416	
	7	DWRE 427	Artificial Intelligence in Water Resources	الذكاء الاصطناعي في الموارد المائية	English								3	33	17	50	2.00	C		
							8	0	0	4	3	11	0	21	411	339	750	30		
Total Weekly Hours							26													

MODULE DESCRIPTION

Module Information				
معلومات المادة الدراسية				
Module Title	Design of Hydraulic Structures I		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar	
Module Code	DWRE 411			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	4	Semester of Delivery		1
Administering Department	Dam and Water Resources Engineering (DWRE)	College	College of Engineering	
Module Leader	Nashwan Kamal Aldeen Mohammed		e-mail	nashwan.alomari@uomosul.edu.iq
Module Leader's Acad. Title	Asst. Prof.		Module Leader's Qualification	Ph.D.
Module Tutor	Maad Majid Kalyana		e-mail	maad.kalyana@uomosul.edu.iq
Peer Reviewer Name	Dr. Omar Muqdad Abdulgany		e-mail	o.agma@uomosul.edu.iq
Scientific Committee Approval Date		Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. An ability to apply the engineering design process to produce solutions that meet specified needs with consideration for public health and safety, and global, cultural, social, environmental, economic, and other factors as appropriate to the discipline.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Classify the hydraulic structures and their uses, 2. Recognize problems accompanying water seepage under the hydraulic structures, 3. Apply the basic concepts of engineering to calculate seepage and uplift pressure under different hydraulic structures, 4. Develop and solve design problems and analyze the data to evaluate the feasibility of components of some types of stilling basin and head and cross regulator.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Introduction of the hydraulic structures. • Some theories for estimating the uplift pressure and piping phenomena in hydraulic structures - Bligh's theory, - Lane's theory, - Khosla's theory, and - Flow net analysis. [20 hrs] • Protection works of approaches for the horizontal floor. [4 hrs] • Introduction of a hydraulic jump, its types, efficiency, length, position, and tailwater conditions. [4 hrs] • Stilling basins. - Introduction - Design of R.S.Varshney stilling basin - Design of SAF stilling basin, and - U.S.B.R II stilling basin. [12 hrs] • Cross regulator and head regulator.

	- Introduction and design steps of the cross regulator and head regulator. - Design example - Apply example [20 hrs]
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	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.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (5)	5, 10	LO #2
	Assignments	2	10% (5)	2, 12	LO #2
	Monthly	2	20% (10)	13	LO #2
Summative assessment	Midterm Exam	1.5 hr	10% (10)	7	LO #2
	Final Exam	3hr	50% (50)	16	LO #2
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الاسبوعي النظري

	Material Covered
Week 1	Subject topics- Introduction of types of hydraulic structures
Week 2	Uplift pressure – Bligh theory – applied example
Week 3	Lane theory– applied example – Flow net analysis
Week 4	Khosla's theory – exit gradient.
Week 5	Practical training example of using Khosla's theory
Week 6	Protection works of approaches for horizontal floor
Week 7	Mid-term Exam + Hydraulic jump- types of tailwater condition and drawing of hydraulic jump
Week 8	Stilling basins - R.S.Varshney stilling basin - applied example
Week 9	SAF stilling basin - applied example
Week 10	U.S.B.R II stilling basin - applied example
Week 11	Introduction and design steps of the cross regulator and head regulator

Week 12	Design and practical training example of the cross and head regulator
Week 13	Continue a design and practical training example of the cross and head regulator
Week 14	Continue a design and practical training example of the cross and head regulator
Week 15	Continue a design and practical training example of the cross and head regulator + General Revision
Week 16	A preparatory week before the Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	none
Week 2	none
Week 3	none
Week 4	none
Week 5	none
Week 6	none
Week 7	none

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Varshney, R.S., Gupta, S. C., Gupta, R. L., (1979) " <i>Theory & design of irrigation structures</i> ". Nem Chand & Bros; Roorkee, India.	Yes

Recommended Texts	1. Asawa, G. L. (2008) <i>"Irrigation and Water Resources Engineering"</i> New Age International(P) Limited, Publishers. 2. Chanson, Hubert., (2004) <i>"The Hydraulics of Open Channel Flow: An Introduction"</i> Elsevier. 3. Chow, Ven te., (1959) <i>"Open Channels Hydraulics"</i> Mc Graw Hill.	No
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Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work is required but credit awarded
	F – Fail	راسب	(0-44)	A considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Information			
معلومات المادة الدراسية			
Module Title	Design of Gravity Irrigation Systems		Module Delivery
Module Type	Core		☐ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar
Module Code	DWRE 412		
ECTS Credits	5		
SWL (hr/sem)	150		
Module Level	4	Semester of Delivery	1
Administering Department	Dam and Water Resources Engineering	College	College of Engineering
Module Leader	Dr. Zeyad Ayoob Sulaiman	e-mail	z.alsinjari@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Maad Magid Kelyana	e-mail	maad.kalyana@uomosul.edu.iq
Peer Reviewer Name	Dr. Anmar Al Talib	e-mail	anmar.altalib@uomosul.edu.iq
Scientific Committee Approval Date	04/09/2026	Version Number	2.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	DWRE 313: Irrigation Principles and Practices	Semester	3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The aims of the Design of Gravity (Surface) Irrigation Systems module are focused on providing learners with a comprehensive understanding of the principles, techniques, and considerations involved in designing effective and efficient gravity-based surface irrigation systems. The module aims to achieve the following objectives: - Understanding Irrigation Design Principles: The module aims to familiarize learners with the fundamental principles of gravity irrigation design. This includes concepts such as water requirements, soil properties, crop water needs, and environmental factors that influence irrigation system design. - Surface Irrigation Methods: The module aims to provide learners with an understanding of different surface irrigation methods, such as furrow irrigation, border irrigation, and basin irrigation. Learners will gain insights into the characteristics, advantages, and limitations of each method. - Soil-Water Relationships: The module aims to enhance learners' understanding of the interaction between water and soil in surface irrigation systems. This includes topics such as infiltration, percolation, water distribution, and the impact of soil properties on water movement. - Field Layout and Design Considerations: The module focuses on the design considerations and techniques for laying out irrigation fields, including factors such as field topography, soil conditions, land availability, local regulations, and budgetary limitations. Learners will learn to analyze and integrate these factors into their design decisions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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)

Indicative Contents المحتويات الإرشادية	This course provides a comprehensive overview of various types of irrigation systems in term of description and design. This course is one of the essential courses for students of the Department of Dams and Water Resources Engineering, through which students are identified and trained in collecting basic data required to design surface irrigation systems using the most effective design procedure. The course includes the following topics: • Introduction to the farm irrigation and the basics of system design/ Basic design Factors/Consumptive use /Soil /Irrigation interval and water application depth. (15hr) • Efficiency ,adequacy ,and uniformity of irrigation, Water infiltration into soil. (20hr) • Land grading/description ,criteria ,and preparatory steps, Design of land grading/Slopes and field levels, Earthwork balance and earthwork calculations • Surface irrigation/Mechanism of surface irrigation process/Infiltration opportunity time and application depth, Water balance concept in surface irrigation. (20hr) • Border irrigation system/Assumptions ,considerations ,and limitations of design/Miscellaneous notes, Design flow rate/Flow depth/Maximum border length/Border width. (15hr) • Furrow irrigation/Furrow intake characteristics, Considerations, assumptions, limitations, and design equations, Runoff control techniques/Cutback irrigation, Runoff recovery system. (20hr) • Basin irrigation/ Considerations, assumptions, limitations, and design equations/Booher method. (15hr)
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	When designing the module for the Design of Gravity Irrigation Systems, several strategies can be employed to enhance learning outcomes and engagement.

	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 real-world design projects. By implementing these strategies, the Design of Gravity Irrigation Systems module can create an engaging and effective learning experience that prepares learners with the knowledge and skills needed for designing efficient and sustainable irrigation systems.
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	20% (15)	2, 5, 7, 10, 11, 13	LO #1, 2 and 5
	Assignments	3	5% (5)	2, 8, 12	LO #1, 3, 4 and 5
	Projects /	1	10% (10)	Continuous	All

	Report	1	5% (5)	13	LO # 1, 2 and 5
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to the farm irrigation and the basics of system design
Week 2	Basic design Factors/Consumptive use/Soil/Irrigation interval and water application depth
Week 3	Efficiency ,adequacy ,and uniformity of irrigation
Week 4	Water infiltration into soil
Week 5	Land grading/Description ,criteria ,and preparatory steps/ Design of land grading/Slopes and field levels
Week 6	Earthwork balance and earthwork calculations
Week 7	Applications on calculation of design slopes by different methods, Applications on calculation of design levels and earthwork
Week 8	Surface irrigation/Mechanism of surface irrigation process/Infiltration opportunity time and application depth
Week 9	Water balance concept in surface irrigation
Week 10	Border irrigation system/Assumptions ,considerations ,and limitations of design/Miscellaneous notes
Week 11	Design flow rate/Flow depth/Maximum border length/Border width
Week 12	applications on design of border irrigation system
Week 13	Furrow irrigation/Furrow intake characteristics/ Considerations, assumptions, limitations, and design equations

Week 14	Runoff control techniques/Cutback irrigation, Runoff recovery system
Week 15	Basin irrigation/ Considerations, assumptions, limitations, and design equations/Booher method
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	On-farm irrigation systems engineering\by A.Y.Hachum, and H.I.Yasin. textbook- Mosul University,1992.	Yes
Recommended Texts	Recahrd H. Cuenca Irrigation System Design: An Engineering Approach, 1989.	Yes
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50- 100)	A- Excellent	امتياز	90- 100	Outstanding Performance
	B- Very Good	جيد جدا	80- 89	Above average with some errors
	C- Good	جيد	70- 79	Sound work with notable errors
	D- Satisfactory	متوسط	60- 69	Fair but with major shortcomings
	E- Sufficient	مقبول	50- 59	Work meets minimum criteria

Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

Module Information					
معلومات المادة الدراسية					
Module Title	Design of Earth and Earth Rock Fill Dams		Module Delivery		
Module Type	C		☐ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	DWRE 413				
ECTS Credits	6				
SWL (hr/Sem)	150				
Module Level		Fourth	Semester of Delivery		Fall 2026-2027
Administering Department		Dams and Water resources	College	College of Engineering	
Module Leader	Dr. Saher Samer		e-mail	s.alhilali@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification		PHD
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		

Scientific Committee Approval Date	1/9/2026	Version Number	1
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Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This course aims to introduce fourth-year students to the principles of hydraulic design and hydrological aspects of dams and reservoirs. It focuses on specifying, analyzing, and preliminarily designing concrete gravity dams and arch dams based on site and valley conditions, as well as evaluating foundation types, modes of failure, and the stability forces acting on dam structures.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Specify Dam Types: Ability to select and specify the appropriate type of gravity or arch dam based on valley and site conditions. 2. Analyze Structural Forces: Ability to identify and analyze all forces, loads, and stresses acting on gravity and arch dam bodies. 3. Problem Solving: Ability to identify potential engineering problems in dam analysis and propose suitable design solutions. 4. Preliminary Design: Ability to formulate preliminary design specifications for gravity and arch dams based on the selected type and foundation characteristics.
Indicative Contents المحتويات الإرشادية	1. Hydrological & Hydraulic Concepts: Introduction to hydrological aspects related to dam construction and reservoir objectives. 2. Gravity & Arch Dams: Types, classification, and selection criteria according to valley geography. 3. Foundations & Site Conditions: Types of dam foundations and structural interactions.

	4. Force & Stress Analysis: Comprehensive evaluation of forces, stability, and stress distribution on dam structures. 5. Failure Modes & Safety: Analysis of potential modes of failure in gravity dams and countermeasures. 6. Preliminary Design Procedures: Practical design formulations for concrete gravity and arch dams.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	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.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem)	78	Structured SWL (h/w)	5
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem)	72	Unstructured SWL (h/w)	5
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150
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Module Evaluation تقييم المادة الدراسية					
As		Time/Number العدد	Weight (Marks) الوزن (الدرجات)	Week Due الاسبوع	Relevant Learning Outcome مخرجات التعلم ذات الصلة
Formative assessment التقييم التكويني	Quizzes امتحانات يومية	3	10	3,6,9	
	Assignments واجبات	4	10	2,4,10,12	
	Projects / Lab. مشاريع/ مختبر	3	5	3,6,12	
	Report تقرير	1	5	14	
Summative assessment التقييم النهائي	Midterm Exam امتحان منتصف الفصل الدراسي	1	20	8	
	Final Exam الامتحان النهائي	1	50	16	
Total assessment المجموع			100		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Hydrological Aspects (Introduction to dam engineering, storage works, hydrological aspects, geological investigations, reservoir site selection, reservoir storage zones)
Week 2	Hydrological Aspects (Introduction to dam engineering, storage works, hydrological aspects, geological investigations, reservoir site selection, reservoir storage zones)
Week 3	Storage Capacities (Estimating reservoir capacity/live storage: tabulation method, sequent peak analysis, optimization analysis)
Week 4	Storage Capacities (Estimating reservoir capacity/live storage: tabulation method, sequent peak analysis, optimization analysis)
Week 5	Reservoir Sedimentation (Sedimentation in reservoirs, reservoir service life)
Week 6	Dam Classification (Classification of dams, selection of dam type)
Week 7	Gravity Dams (Gravity dams: advantages and disadvantages)
Week 8	Gravity Dams (Gravity dams: failure modes and criteria)
Week 9	Gravity Dams (Gravity dams: stresses)
Week 10	Gravity Dams (Gravity dams: design criteria)
Week 11	Gravity Dams (Preliminary design of gravity dams)
Week 12	Arch Dams
Week 13	Arch Dams
Week 14	Arch Dams
Week 15	Arch Dams
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?

Required Texts	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 Texts	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.	
Websites		

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

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

Module Information				
معلومات المادة الدراسية				
Module Title	Engineering Management and Economics		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	DWRE 414			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGx11 4	Semester of Delivery	1	
Administering Department	Dams and water Resources	College	Engineering	
Module Leader	Dr.Rasha M. Sami		e-mail	Rasha.fadhil@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PhD	
Module Tutor	Noor Kattab		e-mail	n.kattab@uomosul.edu.iq
Peer Reviewer Name	Dr.Omar Agha		e-mail	o.agha@uomosul.edu.iq
Scientific Committee Approval Date	7/09/2026	Version Number	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	• Understanding the fundamentals of economics: Provide students with basic economic concepts related to engineering, such as supply and demand, costs, and returns. • Economic feasibility analysis: Train students to evaluate engineering projects from an economic perspective, including cost–benefit studies. • Decision-making: Enable students to use economic tools to support engineering and managerial decisions. • Financial evaluation: Introduce students to financial evaluation methods such as Net Present Value (NPV) and Internal Benefit-Cost Ratio (IBCR).
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Applying economic concepts: The student's ability to use fundamental economic concepts in analyzing engineering problems. • Financial feasibility analysis: Mastery of project evaluation methods • Cost estimation: Skill in preparing accurate estimates of direct and indirect costs for engineering projects. • Economic decision-making: The ability to select engineering alternatives based on economic analysis.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Fundamentals of Engineering Economics. • Evaluation and Comparison of Engineering Projects.

- Project Financial Management.
- Economic feasibility study for projects.
- Depreciation.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

The learning strategy of Engineering Economics emphasizes building a clear foundation in fundamentals, then applying it to project evaluation, financial management, and feasibility studies. Students also learn depreciation to understand asset value over time. This integrated approach develops their ability to analyze costs, assess project viability, and apply economic principles directly to engineering practice.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

As	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
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Formative assessment	First monthly Exam	1.5 hr	15% (15)	7	#1, 2, 3 ,4,5,6and 7
	Second monthly Exam	1.5hr	15% (15)	13	# 8, 9,10,11 and 12
Summative assessment	Class work	0.5 hr	10% (10)	3,5,9,10,14	All
	Mid- Exam	1.5hr	10% (10)	15	All
	Final Exam	3hr	50% (50)		All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	· Introduction, Principles of Engineering Economics, Cash Flow Diagram, Types of Interest Compounding
Week 2	· Relationship among: Present and Future Worth, Uniform Annual Series, Uniform Gradient Series
Week 3	· Comparison of Engineering Projects: Present Worth (PW) Method, Future Worth (FW) Method
Week 4	· Annual Worth (AW) Method, Benefit/Cost Ratio Method (4 hrs)
Week 5	· Internal Rate of Return (IRR) Method, Minimum Attractive Rate of Return (MARR) (4 hrs)
Week 6	· Tender and Project Pricing, Project Crashing
Week 7	· Progress Payments, Cash Flow Forecasting
Week 8	· First Monthly Exam
Week 9	· Economic Feasibility Study for Projects
Week 10	· Economic Feasibility Measures for Projects + Examples
Week 11	· Break-Even Point Analysis
Week 12	· Depreciation and Valuation and Their Methods
Week 13	· Second Exam

Week 14	· Depreciation and Valuation Methods + Examples
Week 15	· Midterm Exam
Week 16	· Preparatory Week before the Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Engineering Economy (7th ed.), L. Blank and A. Tarquin (2012), McGraw-Hill. 2-Water Resources Systems Planning and Management, S.K. Jain and V.P. Singh (2003), Elsevier. 3-Water Resources Handbook for Economics, NRCS (1998). 4-Engineering Economy,William G. Sullivan, Elin M. Wicks, Joseph H. Wilck – Pearson (18th Edition, 2024). 5-Fundamentals of Engineering Economic Analysis, John A. White, Kellie S. Grasman, Kenneth E. Case, Kim LaScola Needy, David B. Pratt – Wiley (2nd Edition).	Yes
Recommended Texts	Engineering Economic Analysis, Oxford, New York,2004	Yes
Websites	https://www.koenig-solutions.com/primavera-P6-professional-project-management-rel-19-Ed-1-	

Grading Scheme

مخطط الدرجات

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

Success Group (50 - 100)	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Module Information					
معلومات المادة الدراسية					
Module Title	Design of Irrigation and Drainage Networks		Module Delivery		
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar		
Module Code	DWRE 415				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UGx11 4	Semester of Delivery		1
Administering Department		Type Dept. Code	College	Type College Code	
Module Leader	Azza Nsralla Al-Talib		e-mail	a.altalib@uomosul.edu.iq	

Module Leader's Acad. Title	Asst. Prof.	Module Leader's Qualification	M.Sc.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	15/06/2023	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The design of irrigation and drainage network is the basic subject for fourth-stage students in the dams and water resources engineering department that from this subject students will learn and practice to compute how to design irrigation and drainage network for deferent irrigation projects with different dimensions consider standard designs for water resources ministry in Iraq.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	5. Layout an irrigation and drainage network on a contour map. 6. Calculate served area and discharge according to water supply system. 7. Design earth canals, lined canals and drains according to the design criteria for Iraq. 8. Draw the synoptic diagram for canals and drains shows the ground level, water level and water level slope which are more important for design.

	9. Determine whether or not the design for irrigation and drainage system is valid according to the design standards for Iraq . 10. Calculate the seepage loss and decided if the canal needed to line or not. 11. Draw the longitudinal section which shows the dimensions for canals and drains and the cross sections show the amount of cutting and filling.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Introduction, Classification of Irrigation and drainage network, Canal system, drainage system (4hrs) • Nomenclature a numbering Irrigation and drainage network, Layout of Irrigation and drainage network(4hrs) • The synoptic diagram of water levels in canals, class work1(4hrs) • The synoptic diagram of water levels in drains, class work2(4hrs) • Water supply system, command area, class work3(4hrs) • Unlined Canals , Types of unlined canals(4hrs) • hydraulic design of unlined canal section of Lacey Equations & Tractive Force Theory, class work4(4hrs) • hydraulic design of unlined canal using general design method, class work5(4hrs) • Methods of seepage losses, class work6(4hrs) • Standard dimensions and Hydraulic design of lined canal, class work7(4hrs) • Standard dimensions and discharge of drains, Hydraulic design of drains, class work8(4hrs) • Longitudinal section details, class work9(4hrs) • Cross section details , class work10(4hrs) • First monthly Exam(2hrs) • Second monthly Exam(2hrs) • Preparatory week before the final Exam(4hrs)

- **Final Exam(3hrs)**

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

The main strategy that will be adopted in delivering this module is to encourage student's participation in the tutorial exercises close to reality in terms of contour maps, network layout, calculating the service area, then finding the discharge according to the used irrigation system, and designing the sections of canals and drains according to the Iraqi design criteria ,in addition of using computer programs such as AUTOCAD in calculating areas and drawing a synoptic diagram, longitudinal and cross sections.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
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As					
Formative assessment	First monthly Exam	2 hr	15% (15)	7	#1, 2, 3 and 4
	Second monthly Exam	2hr	15% (15)	15	# 5, 6 and 7
Summative assessment	Class work	2 hr	10% (10)	3,4,5,8-14	All
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Introduction, Classification of Irrigation and drainage network, Canal system, drainage system
Week 2	Nomenclature a numbering Irrigation and drainage network, Layout of Irrigation and drainage network
Week 3	The synoptic diagram of water levels in canals, class work1
Week 4	The synoptic diagram of water levels in drains, class work2
Week 5	Water supply system, command area, class work3
Week 6	Unlined Canals , Types of unlined canals
Week 7	First monthly Exam
Week 8	hydraulic design of unlined canal section of Lacey Equations & Tractive Force Theory, class work4
Week 9	hydraulic design of unlined canal using general design method, class work5
Week 10	Methods of seepage losses, class work6
Week 11	Standard dimensions and Hydraulic design of lined canal, class work7

Week 12	Standard dimensions and discharge of drains, Hydraulic design of drains, class work8
Week 13	Longitudinal section details, class work9
Week 14	Cross section details , class work10
Week 15	Second monthly Exam
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Design Manual for Irrigation and Drainage, Pencol Engineering Consultants, London	No
Recommended Texts	Theory and Design of irrigation structures (vol.1 By: Varshney,R.S. ,Gupta,S.C. and Gupta, R. NEMCHAND & BROS, ROORKEE,INDIA,1977	Yes
Websites	https://uclouvain.be/en-cours-2023-lbres2104	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

Module Information				
معلومات المادة الدراسية				
Module Title	Engineering Project I		Module Delivery	
Module Type	Core		☐ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☒ Seminar	
Module Code	DWRE 416			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	4	Semester of Delivery	1	
Administering Department	DWRE	College	COE	
Module Leader		e-mail		
Module Leader's Acad. Title		Module Leader's Qualification		
Module Tutor		e-mail		
Peer Reviewer Name		e-mail		
Scientific Committee Approval Date	1/9/2026	Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The purpose of the Graduation Project is to assure/ascertain that the students have acquired the skills, knowledge, and concepts necessary to perform well when they leave the university. Each student will use educational tools to broaden his/her knowledge about a particular, self-selected topic. Students are also expected to show how proficient they are in solving real-world problems with certain constraints for the outcome-based evaluation by the review board.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of this course, students will be able to: LO1. Understand and apply the fundamentals of engineering-design practices and procedures LO 2. Participate in teamwork activities. LO 3. Implement the techniques of oral and written presentations. LO 4. Identify an engineering problem and assess alternative solutions. LO 5. Apply project management fundamentals. LO 6. Understand the ethics of the engineering profession and water resources engineering issues. LO 7. Interact with industry and related non-governmental organizations.
Indicative Contents المحتويات الإرشادية	The graduation project will be a meaningful experience that provides a student with the opportunity for in-depth learning about a selected topic. The purpose of the project is to assure that the student is able to apply, analyze, synthesize, and evaluate information and communicate significant

	knowledge and understanding through a presentation. The project will be under the guidance and direction of the dept. faculty/administrators and will be assessed by an evaluation team.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Technical Report - Literature Review and Analysis - Project Problem Formulation and Solutions (Goals) - Report Organization - According to the template of the department Methodology and Procedures - Design - Implementation - Testing Individual Student Evaluation - Individual Contribution - Oral Presentation - Team Work Individual Student Evaluation by the Supervisor - Individual Contribution - Student Commitment - Team Work.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Supervisor evaluation		40%(50)		All
Summative assessment					
	Presentation	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Research Plan
Week 2	Data collection
Week 3	Previous Works
Week 4	Study the Problem
Week 5	Propose Solutions
Week 6	Analysis of Proposed Solutions
Week 7	Design the Proposed Solution
Week 8	Solutions Application
Week 9	Make the Required Measurements
Week 10	Analysis of the Results
Week 11	Design Reconsideration
Week 12	Project Testing and begin writing
Week 13	Project Writing
Week 14	Project report submission
Week 15	Presentation to the review board and oral examination

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?

Required Texts	Graduation project writing instructions template تعليمات كتابة مشروع التخرج	No
Recommended Texts		No
Websites		

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

Module Information				
معلومات المادة الدراسية				
Module Title	Sustainable water engineering		Module Delivery	
Module Type	C		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	DWRE 417			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	UGx11 4	Semester of Delivery	1	
Administering Department	DWRE	College	ENGINEERING	
Module Leader	Mohammad Awni Khattab	e-mail	m.almukhttar@uomosul.edu.iq	
Module Leader's Acad. Title	assistant Lecture	Module Leader's Qualification	Msc.	
Module Tutor	Name (if available)	e-mail	E-mail	
Peer Reviewer Name	Dr. Omar M. Abdulgany	e-mail	o.agha@uomosul.edu.iq	
Scientific Committee Approval Date	7/6/2026	Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims

أهداف المادة الدراسية

- Introduce students to the concept of water sustainability and its importance in achieving success in the field of water security.
- Understand the components of water-based and natural-synthetic electronics and the factors affecting their sustainability.
- Analyze the challenges facing water resources, such as population growth, climate change, and usage.
- Apply the principles of Integrated Water Resources Management (IWRM) in water resource management.
- Identify details related to water and water harvesting.
- Develop skills in analyzing water data, research findings, and indicators for measuring sustainability.
- Examine the obligations related to water management and its use in maximizing the benefits of water resources.

	• Prepare students to contribute to solving contemporary water problems and to propose diverse solutions after water innovation at the local and regional levels.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Definition of sustainable water resources systems and integrated water resources management 2. Understanding what green education is, its benefits, and its tools 3. Clear understanding of the concepts of water security and sustainable development 4. Understanding the most prominent water problems in Iraq and the effects of the water crisis in Iraq 5. The ability to develop sustainable solutions to achieve water security 6. Understanding the hydrological concept of seasonal basins and the benefits of hydrological and morphological analysis 7. Understanding the most important software programs that enable hydrological analysis 8. Hydrological design capability 9. Understanding the operating principle of hydropower plants 10. Knowledge of the analysis and design of hydropower plants 11. Understanding the types of hydropower stations and how they work
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1- Overview a- Introduction to Green Education [2 hours]. b- Freshwater Impacts [2 hours]. c- Integrated Water Resources Management [2 hours]. 2- Protecting Access Rights a- The Concept of Water Security [2 hours].

	b- The Concept of Scientific Development [2 hours]. c- Balancing the Protection of Access Rights [2 hours]. d- Addressing Challenges and Breakthroughs [2 hours]. 3- Sustainable Rainwater Harvesting a- Hydrological Framework for Seasonal Analysis [6 hours]. b- Benefits of Hydrological and Morphological Analysis [2 hours]. c- Applications and Sustainable Practices for Seasonal Agriculture [4 hours]. 4- Clean Energy (Hydropower) a- Operation of Hydropower Plants [2 hours]. b- Energy Generation in Hydropower Plants [2 hours]. c- Types of Hydropower Plants [2 hours].
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering some challenging problems to motivate students.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem)		Structured SWL (h/w)	
الحمل الدراسي المنتظم للطالب خلال الفصل	33	الحمل الدراسي المنتظم للطالب أسبوعيا	2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (20)	5, 10	LO #1, 2 and 3, 5
	Assignments	2	10% (20)	2, 12	LO # 4 and 6
	Projects / Lab.	0	0	0	
	Report	0	0	0	
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO # 1-9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الأسبوعي النظري

Week	Material Covered
Week 1	Overview
Week 2	Introduction to Green Education
Week 3	Sustainable Water Resource Systems

Week 4	Integrated Water Resources Management
Week 5	The Concept of Water Security
Week 6	The Concept of Sustainable Development
Week 7	The State of Water Resources in Iraq
Week 8	Strategies for Achieving Water Security and Sustainable Development
Week 9	Rainwater Harvesting and Sustainability
Week 10	Hydrological Analysis Software
Week 11	Practical Applications and Advanced Sustainability for Seasonal Basins
Week 12	Midterm Exam
Week 13	Clean Energy (Hydropower)
Week 14	Forms of Energy in Hydropower Plants
Week 15	Types of Hydropower Plants
Week 16	Preparatory Week Before the Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- Integrated Water Resources Management : M. D. Jenkins. -Water Resources Sustainability : Steven M. Gorelick.. -Sustainable Water Management -The Worth of Water: Designing Climate Resilient Rainwater Harvesting Systems Anna Reid ,Sean O'Hogain : Liam McCarton : Springer (2021)	Yes

Recommended Texts	Al-Rafidain Engineering Journal. 1.	No
	Water Resources Management 2.	
	Water Research 3.	
	Sustainable Water Resources Management 4.	
	Journal of Hydrology 5.	
	Environmental Management, M214. 6.	
Websites		

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

Moodle Information					
معلومات المادة الدراسية					
Module Title	Design of Hydraulic Structures II		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar		
Module Code	DWRE 421				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UGx11 4	Semester of Delivery		2
Administering Department		Dam and Water Resources Engineering (DWRE)	College	College of Engineering	
Module Leader	Nashwan Kamal Aldeen Mohammed		e-mail	nashwan.alomari@uomosul.edu.iq	
Module Leader's Acad. Title		Asst. Prof.	Module Leader's Qualification		Ph.D.
Module Tutor	Maad Majid Kalyana		e-mail	maad.kalyana@uomosul.edu.iq	
Peer Reviewer Name		Dr. Omar Muqdad Abdulgany	e-mail	o.gha@uomosul.edu.iq	
Scientific Committee Approval Date			Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	An ability to apply the engineering design process to produce .2 solutions that meet specified needs with consideration for public health and safety, and global, cultural, social, environmental, economic, and other factors as appropriate to the discipline.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Develop and solve design problems and analyze the data to .1 evaluate the feasibility of components of the canal Head works (barrage types), some types of flow transition, cross drainage works, and culverts, Evaluate and analyze the safety of the canal Head works .2 structure (barrage types) and culvert, Demonstrate the ability to lead and productively participate in .3 group situations via assigning multidisciplinary design projects for some of the hydraulic structures.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Canal Headworks (barrage types) - Introduction. - Defining the components of the barrage - Design steps of the undersluice, other barrages, and side [40hrs] main canal. • Transitions - Introduction of transitions (R.S Chaturvedi's, Mitra's, and Hind's transitions). - Design of transitions (Hind's transitions). [10 hrs]. • Cross drainage works. - Syphon design. [13hrs]. • Culvert. - Introduction and design example of the culvert. [12hrs].

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

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.

Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	510% (	5, 10	LO #2
	Assignments	2	510% (	2, 12	LO #2
	Monthly	2	100% (2	13	LO #2

Summative assessment	Midterm Exam	1.5 hr	10% (10)	7	LO #2
	Final Exam	3hr	50% (50)	16	LO #2
Total assessment			100% (100 Marks)		
Delivery Plan (Weekly Syllabus)					
المنهاج الاسبوعي النظري					
Week	Material Covered				
Week 1	Design of canal Head works (barrage types)				
Week 2	Design of undersluice				
Week 3	Design of other barrage				
Week 4	Design of head regulator				
Week 5	Design example of the barrage				
Week 6	Continue a design example of the barrage				
Week 7	Practical training example of the barrage				
Week 8	Mid-term Exam + Transitions: introduction of some types of flow transition.				
Week 9	Design and applied the example of transition				
Week 10	Cross drainage works – Syphon design				
Week 11	Design example of syphon				
Week 12	Practical training example of syphon				
Week 13	Introduction of culverts.				
Week 14	Design example of culverts.				
Week 15	Practical training example of culverts.				
Week 16	A preparatory week before the Final Exam				

Learning and Teaching Resources			
مصادر التعلم والتدريس			
	Text	Available in the Library?	
Required Texts	Varshney, R.S., Gupta, S. C., Gupta, R. L., (1979) <i>"Theory & design of irrigation structures"</i> . Nem Chand & Bros; Roorkee, India.	Yes	
Recommended Texts	Asawa, G. L. (2008) <i>"Irrigation and Water Resources Engineering"</i> New Age International(P) Limited, Publishers. Chanson, Hubert., (2004) <i>"The Hydraulics of Open Channel Flow: An Introduction"</i> Elsevier. Chow, Ven te., (1959) <i>"Open Channels Hydraulics"</i> Mc Graw Hill. Schall, J.D., Thompson, p. L., Zeryes, S. M., Kilgore, R. T., and Morris, J. L. (2012) <i>"Hydraulic design of Highway culverts"</i> (Report No . FHWA – HIF – 12 – 026 HD55).	No	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work is required but credit awarded
	F – Fail	راسب	(0-44)	A considerable amount of work required

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

Module Information					
معلومات المادة الدراسية					
Module Title	Design of Sprinkler and Drip Irrigation Systems		Module Delivery		
Module Type	Core		☐ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar		
Module Code	DWRE 422				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		UGx11 4	Semester of Delivery		2
Administering Department		Dam and Water Resources Engineering	College	College of Engineering	
Module Leader	Dr. Zeyad Ayoob Sulaiman		e-mail	z.alsinjari@uomosul.edu.iq	

Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Dr. Anmar Al Talib	e-mail	anmar.altalib@uomosul.edu.iq
Scientific Committee Approval Date	04/06/2023	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The aim of the Design of Sprinkler and Drip Irrigation Systems module is to provide learners with a comprehensive understanding of the principles, techniques, and considerations involved in designing efficient and effective sprinkler and drip irrigation systems. The module focuses on the following specific aims: 1. Understanding Irrigation Design Principles: The module aims to familiarize learners with the fundamental principles of irrigation design. This includes concepts such as water requirements, soil properties, crop water needs, and environmental factors that influence irrigation system design. 2. Sprinkler System Design: The module aims to equip learners with the knowledge and skills to design sprinkler irrigation systems. This involves understanding different types of sprinklers, their operating characteristics, and selecting appropriate sprinkler heads, spacing, and layout patterns to ensure uniform water distribution across the irrigated area.
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	3. Drip Irrigation System Design: The module aims to provide learners with a comprehensive understanding of drip irrigation system design. This includes topics such as emitter selection, emitter spacing, pipe layout, filtration and pumping requirements, and managing pressure variations to ensure precise water delivery to individual plants or root zones. 4. System Components and Sizing: The module aims to familiarize learners with the various components of sprinkler and drip irrigation systems, such as pipes, valves, filters, pumps, and control systems. Learners will gain the skills to appropriately size and select these components based on factors such as flow rate, pressure requirements, and system layout. 5. Design Considerations and Constraints: The module addresses the practical considerations and constraints that may influence irrigation system design. These may include factors such as topography, soil conditions, land availability, water quality, local regulations, and budgetary limitations. Learners will learn to analyze and integrate these factors into their design decisions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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 required 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)
Indicative Contents المحتويات الإرشادية	The Design of Sprinkler and Drip Irrigation Systems module covers a range of topics to provide learners with a comprehensive understanding of irrigation system design. The indicative contents of the module may include: 1. Introduction to Irrigation Systems (7hr) • Definition and importance of irrigation

	Overview of sprinkler and drip irrigation systems • Advantages and limitations of each system • Irrigation Design Principles (10hr) .2 Water requirements of crops • Soil properties and their impact on irrigation design • Factors influencing crop water needs • Environmental considerations (e.g., climate, • evapotranspiration) Sprinkler System Design (15hr) .3 Types of sprinklers and their characteristics • Sprinkler selection based on crop and application • requirements Sprinkler spacing and layout patterns for uniform water • distribution Hydraulic calculations and pressure regulation • Design considerations for slope and irregular-shaped fields • Drip Irrigation System Design (15hr) .4 Drip system components and their functions • Emitter selection and placement • Determining emitter spacing and flow rates • Designing sub-main and lateral pipe layout • Filtration and pumping requirements • Pressure compensation and managing pressure variations • System Components and Sizing (15hr) .5 Pipes, valves, and fittings in irrigation systems • Selecting appropriate pipe materials and sizes • Sizing and selecting pumps based on system requirements •
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	Designing filtration and fertigation systems • Design Considerations and Constraints (15hr) .6 Topographic considerations and field layout design • Soil and water quality assessments • Budget constraints and cost analysis • System Evaluation (7hr) .7 Monitoring and assessing water distribution uniformity • Evaluating system efficiency and performance • Troubleshooting common issues • Case Studies and Design Projects (10hr) .8 Real-world examples of sprinkler and drip irrigation system design • Design projects to apply learned concepts and principles • Emerging Technologies and Innovations (7hr) .9 Introduction to new technologies and trends in irrigation design • Exploration of precision irrigation, remote sensing, and data-driven decision-making • Note: The above list represents indicative contents and may vary depending on the specific curriculum or course framework.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	When designing the module for the Design of Sprinkler and Drip Irrigation Systems, several strategies can be employed to enhance learning outcomes and engagement. 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
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	through classes, interactive tutorials and by considering type of real-world design projects. By implementing these strategies, the Design of Sprinkler and Drip Irrigation Systems module can create an engaging and effective learning experience that prepares learners with the knowledge and skills needed for designing efficient and sustainable irrigation systems.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	82	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	20% (20)	2, 5, 7, 10, 11, 13	LO #1, 3, 4 and 5
	Assignments	3	5% (5)	2, 8, 12	LO #1, 2, 4 and 5
	Projects /	1	10% (10)	Continuous	All

	Report	1	5% (5)	13	LO # 1, 4 and 5
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Sprinkler irrigation/Sprinkler irrigation basic concept/Advantages and problems of sprinkler irrigation /Basic and supplementary components sprinkler irrigation system/Types of sprinkler irrigation systems
Week 2	Fundamentals of sprinkler irrigation/Single sprinkler water distribution/Layout of stationary system/Hydraulic of sprinkler nozzle
Week 3	Uniformity of sprinkler water distribution
Week 4	Alternate setting of sprinkler laterals/Sprinkler spray losses and sprinkler irrigation efficiency
Week 5	Sprinkler lateral pipes/Fundamentals of flow hydraulic pipes/Allowable pressure variation /Sprinkler pipe size
Week 6	Friction head loss/Layout of sprinkler pipes/Moving and operation sprinkler pipes/Sprinkler pipe material
Week 7	Sprinkler irrigation major pipes distribution system/Types of major pipes distribution system/Design requirements/ Distribution system layout
Week 8	Design methods (flow velocity method, allowable friction method, economic analysis method)
Week 9	Economic analysis general procedure/ Total dynamic head
Week 10	Applications on design of main pipe systems

Week 11	Trickle irrigation/Advantages and problems of drip irrigation/Trickle system basic component/Soil-water-crop factors
Week 12	Emitters selection/Hydraulic of trickle network
Week 13	Hydraulic Design of the main pipeline of pipe network
Week 14	General notes about evaluation of on- farm irrigation systems
Week 15	Applications of Drip Irrigations
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	On-farm irrigation systems engineering\by A.Y.Hachum, and H.I.Yasin. textbook- Mosul University,1992.	Yes
Recommended Texts	Recahrd H. Cuenca Irrigation System Design: An Engineering Approach, 1989.	Yes
Websites		

Grading Scheme

مخطط الدرجات

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

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

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

Module Information					
معلومات المادة الدراسية					
Module Title	Design of Gravity and Arch Dams		Module Delivery		
Module Type	C		☒ Theory * ☐ Lecture * ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	DWRE 423				
ECTS Credits	6				
SWL (hr/Sem)	150				
Module Level		Fourth	Semester of Delivery		spring 2026-2027
Administering Department		Dams and Water resources	College	College of Engineering	
Module Leader	Dr. Saher Samer		e-mail	s.alhilali@uomosul.edu.iq	

Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PHD
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/9/2026	Version Number	1

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	To provide fourth-year students with complete awareness and knowledge about earth and rock-fill dams. This includes understanding the modes of failure in earth dams, design considerations, seepage control through both the body and foundation of the dam, as well as the components, types, and design of spillways.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Formulate a preliminary design of an earth dam. • An ability to specify the problems of seepage through the body of an earth dam. • An ability to specify the problems of seepage through the foundation of an earth dam.
Indicative Contents المحتويات الإرشادية	1. Earth and Rock fill Dams: General introduction, foundations for earth dams, and suitable available materials. 2. Modes of Failure: Modes of failure in earth dams. 3. Phreatic Line: Location of a phreatic line.

	4. Design Considerations: Design considerations of earth dams. 5. Seepage Control: - o Seepage control through the body of the dam. - o Seepage control through the foundation. 6. Stability of Slopes: Slope stability analysis and Swedish Standard Method of Slices. 7. Spillways: Components of spillways, types of spillways, and spillway design.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	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.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

As		Time/Number العدد	Weight (Marks) الوزن (الدرجات)	Week Due الاسبوع	Relevant Learning Outcome مخرجات التعلم ذات الصلة
Formative assessment التقييم التكويني	Quizzes امتحانات يومية	3	10	3,6,9	
	Assignments واجبات	4	10	2,4,10,12	
	Projects / Lab. مشاريع/ مختبر	3	5	3,6,12	
	Report تقرير	1	5	14	
Summative assessment التقييم النهائي	Midterm Exam امتحان منتصف الفصل الدراسي	1	20	8	
	Final Exam الامتحان النهائي	1	50	16	
Total assessment المجموع			100		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Earth and Rock-fill Dams
Week 2	Earth and Rock-fill Dams (Foundation types and available materials)
Week 3	Earth and Rock-fill Dams (Failure modes in earth dams)

Week 4	Location of the phreatic line within the dam body
Week 5	Design of Earth and Rock-fill Dams
Week 6	Seepage Control (Seepage within the earth dam body)
Week 7	Seepage Control (Seepage within the earth dam body)
Week 8	Seepage Control (Seepage in the dam foundation)
Week 9	Seepage Control (Seepage in the dam foundation)
Week 10	Slope Stability (Slope stability)
Week 11	Slope Stability (Standard Swedish Method)
Week 12	Slope Stability (Standard Swedish Method)
Week 13	Spillway (Components, types)
Week 14	Spillway (Design principles)
Week 15	Spillway (Design principles)
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	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 Texts	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.	
Websites		

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

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

Module Information		
معلومات المادة الدراسية		
Module Title	Design of Gravity and Arch Dams	Module Delivery
Module Type	C	*
		*

Module Code	DWRE 423	☐ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
ECTS Credits	6		
SWL (hr/Sem)	150		
Module Level	Fourth	Semester of Delivery	spring 2026-2027
Administering Department	Dams and Water resources	College	College of Engineering
Module Leader	Dr. Saher Samer	e-mail	s.alhilali@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PHD
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/9/2026	Version Number	1

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	To provide fourth-year students with complete awareness and knowledge about earth and rock-fill dams. This includes understanding the modes of failure in earth dams, design considerations, seepage control through both the body and foundation of the dam, as well as the components, types, and design of spillways.
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Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Formulate a preliminary design of an earth dam. • An ability to specify the problems of seepage through the body of an earth dam. • An ability to specify the problems of seepage through the foundation of an earth dam.
Indicative Contents المحتويات الإرشادية	8. Earth and Rock fill Dams: General introduction, foundations for earth dams, and suitable available materials. 9. Modes of Failure: Modes of failure in earth dams. 10. Phreatic Line: Location of a phreatic line. 11. Design Considerations: Design considerations of earth dams. 12. Seepage Control: - o Seepage control through the body of the dam. - o Seepage control through the foundation. 13. Stability of Slopes: Slope stability analysis and Swedish Standard Method of Slices. 14. Spillways: Components of spillways, types of spillways, and spillway design.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	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.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

As		Time/Number العدد	Weight (Marks) الوزن (الدرجات)	Week Due الاسبوع	Relevant Learning Outcome مخرجات التعلم ذات الصلة
Formative assessment التقييم التكويني	Quizzes امتحانات يومية	3	10	3,6,9	
	Assignments واجبات	4	10	2,4,10,12	
	Projects / Lab. مشاريع/ مختبر	3	5	3,6,12	
	Report تقرير	1	5	14	
Summative assessment التقييم النهائي	Midterm Exam امتحان منتصف الفصل الدراسي	1	20	8	
	Final Exam	1	50	16	

	الامتحان النهائي				
Total assessment المجموع			100		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Earth and Rock-fill Dams
Week 2	Earth and Rock-fill Dams (Foundation types and available materials)
Week 3	Earth and Rock-fill Dams (Failure modes in earth dams)
Week 4	Location of the phreatic line within the dam body
Week 5	Design of Earth and Rock-fill Dams
Week 6	Seepage Control (Seepage within the earth dam body)
Week 7	Seepage Control (Seepage within the earth dam body)
Week 8	Seepage Control (Seepage in the dam foundation)
Week 9	Seepage Control (Seepage in the dam foundation)
Week 10	Slope Stability (Slope stability)
Week 11	Slope Stability (Standard Swedish Method)
Week 12	Slope Stability (Standard Swedish Method)
Week 13	Spillway (Components, types)
Week 14	Spillway (Design principles)
Week 15	Spillway (Design principles)
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	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 Texts	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.	
Websites		

Grading Scheme

مخطط الدرجات

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

(0 – 49)	F – Fail	راسب	(0-44)	Considerable amount of work required

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

Module Information				
معلومات المادة الدراسية				
Module Title	Water Supply Engineering		Module Delivery	
Module Type	S		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	DWRE 425			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	4	Semester of Delivery	2	
Administering Department	DWRE	College	ENGINEERING	
Module Leader	Ahmed Abdulhameed Ahmed		e-mail	Ahmed.abdal-hameed@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Lecturer		Module Leader's Qualification	Msc.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Omer Miqdad		e-mail	O.agah@uomosul.edu.iq
Scientific Committee Approval Date	01/09/2026		Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	4. Introduce the students the main types of water city supply systems, the main networks and how to control it. 5. The requirement to supply water and cover a whole area, with the fitting that have to use with networks. 6. The branched channel and how to connect also covered and pumping system. 7. Analyze small networks flowed by a discussion to improve the efficiency of the networks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	12. Recognize the common types of networks to supply water in a city 13. Recognize the common limitations and requirements to supply water 14. Apply the basic concepts of sciences and engineering to solve issues associated with small networks 15. Formulate the main parameter to affect the networks of supplying water, fitting and pumps
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to the main types of city supply systems, with limitations [4 hrs]. Measuring the required to supply water, discharge and pressure. [4 hrs]. Identify the main usage for each type of the networks [4hrs]. Minor losses of the fittings [4 hrs]. Connect pipes in parallel and series ,Branched channel, connect with tanks [8 hrs] Hardy- cross method to measure discharge in each pipe of a networks[4 hrs]. Pumps: connections and efficiency[5hrs].
Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	

	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2 and 3
	Assignments	2	10% (10)	2, 12	LO # 2 and 3
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 3
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO # 1and 2
	Final Exam	3hr	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to the main types of city supply systems, with limitations
Week 2	Introduction to the main types of city supply systems, with limitations

Week 3	Measuring the required to supply water, discharge and pressure.
Week 4	Measuring the required to supply water, discharge and pressure.
Week 5	Identify the main usage for each type of the networks
Week 6	Minor losses of the fittings
Week 7	Minor losses of the fittings
Week 8	Connect pipes in parallel and series
Week 9	Connect pipes in parallel and series
Week 10	Branched channel, connect with tanks
Week 11	Branched channel, connect with tanks
Week 12	Hardy- cross method to measure discharge in each pipe of a networks
Week 13	Hardy- cross method to measure discharge in each pipe of a networks
Week 14	Pumps: connections and efficiency
Week 15	Pumps: connections and efficiency
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Vennard, J.K., 1963. Elementary fluid mechanics. 4th edition.	Yes
Recommended Texts	Mays, L.W., 2000. Water distribution system handbook. McGraw-Hill Education.	No

	McGhee, T.J. and Steel, E.W., 1991. Water supply and sewerage (Vol. 6). New York: McGraw-Hill..	
Websites		

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

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

Module Information معلومات المادة الدراسية		
Module Title	Engineering Project II	Module Delivery
Module Type	C	☐ Theory ☐ Lecture ☐ Lab
Module Code	DWRE 426	
ECTS Credits	2	

SWL (hr/sem)	50	☐ Tutorial ☒ Practical ☒ Seminar	
Module Level	4	Semester of Delivery	2
Administering Department	DWRE	College	COE
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/9/2026	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	DWRE 416	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The purpose of the Graduation Project is to assure/ascertain that the students have acquired the skills, knowledge, and concepts necessary to perform well when they leave the university. Each student will use educational tools to broaden his/her knowledge about a particular, self-selected topic. Students are also expected to show how proficient they are in solving real-world problems with certain constraints for the outcome-based evaluation by the review board.
Module Learning Outcomes	On successful completion of this course, students will be able to: LO1. Understand and apply the fundamentals of engineering-design practices and procedures

مخرجات التعلم للمادة الدراسية	LO 2. Participate in teamwork activities. LO 3. Implement the techniques of oral and written presentations. LO 4. Identify an engineering problem and assess alternative solutions. LO 5. Apply project management fundamentals. LO 6. Understand the ethics of the engineering profession and water resources engineering issues. LO 7. Interact with industry and related non-governmental organizations.
Indicative Contents المحتويات الإرشادية	The graduation project will be a meaningful experience that provides a student with the opportunity for in-depth learning about a selected topic. The purpose of the project is to assure that the student is able to apply, analyze, synthesize, and evaluate information and communicate significant knowledge and understanding through a presentation. The project will be under the guidance and direction of the dept. faculty/administrators and will be assessed by an evaluation team.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Technical Report - Literature Review and Analysis - Project Problem Formulation and Solutions (Goals) - Report Organization - According to the template of the department Methodology and Procedures - Design - Implementation - Testing Individual Student Evaluation - Individual Contribution - Oral Presentation
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	- Team Work
	Individual Student Evaluation by the Supervisor
	- Individual Contribution - Student Commitment - Team Work.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Supervisor evaluation		40%(50)		All

Summative assessment					
	Presentation	2hr	50% (50)	16	All
Total assessment			100% (100)Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Research Plan
Week 2	Data collection
Week 3	Previous Works
Week 4	Study the Problem
Week 5	Propose Solutions
Week 6	Analysis of Proposed Solutions
Week 7	Design the Proposed Solution
Week 8	Solutions Application
Week 9	Make the Required Measurements
Week 10	Analysis of the Results
Week 11	Design Reconsideration
Week 12	Project Testing and begin writing
Week 13	Project Writing

Week 14	Project report submission
Week 15	Presentation to the review board and oral examination

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Graduation project writing instructions template تعليمات كتابة مشروع التخرج	No
Recommended Texts		No
Websites		

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

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

Module Information

معلومات المادة الدراسية

Module Title	Artificial Intelligence in Water Resources		Module Delivery		
Module Type	C		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	DWRE 427				
ECTS Credits	2				
SWL (hr/Sem)	50				
Module Level			Semester of Delivery		
Administering Department		Dams and Water Resources Engineering	College	Engineering	
Module Leader	Dr. Bashar Munir Yahya		e-mail	bashar1974@uomosul.edu.iq	
Module Leader's Acad. Title			Module Leader's Qualification		
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date			Version Number		

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The curriculum aims to provide students with the fundamental and applied knowledge and skills required to use artificial intelligence techniques in the analysis, management, and modeling of water resources through the following objectives: 1. Introduce students to the fundamental concepts of artificial intelligence and their relationship to water resources engineering. 2. Enable students to prepare, process, and analyze hydrological and climatic data such as rainfall, temperature, surface runoff, evaporation, evapotranspiration, and water levels. 3. Train students to use artificial intelligence models to predict rainfall, surface runoff, and river discharge. 4. Use artificial intelligence techniques for drought and flood prediction. 5. Apply machine-learning algorithms such as ANN, SVM, Random Forest, and XGBoost to solve water resources problems. 6. Train students to evaluate model performance using indicators such as R^2, RMSE, MAE, and NSE, compare models, and select the best-performing model. 7. Develop students' ability to use software and programming environments, particularly Python, to build simplified artificial-intelligence models for hydrological applications. 8. Introduce students to the potential of artificial intelligence for studying the impacts of climate change and water scarcity and predicting future scenarios. Overall curriculum objective: Prepare a water resources engineer capable of integrating conventional hydrological knowledge with modern artificial-intelligence techniques to develop more accurate and efficient solutions for forecasting, management, planning, and water-related decision-making.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Module Learning Outcomes After successfully completing the requirements of this module, students are expected to be able to: 12. Become familiar with Python and read simple hydrological datasets. 13. Develop the ability to design an integrated applied project, starting with data collection and processing, proceeding

	through model development and training, and ending with evaluation and engineering interpretation of the results. 14. Design different types of surface irrigation systems after collecting, analyzing, and organizing the required design data in accordance with surface-irrigation system design requirements. 15. Develop students' critical thinking regarding model accuracy, uncertainty, interpretability, and the ethics of using artificial intelligence in water resources decisions.
Indicative Contents المحتويات الإرشادية	This module provides a comprehensive overview of artificial intelligence applications in water resources engineering in terms of description, design, and implementation of relevant AI functions. It is a core module for students in the Department of Dams and Water Resources Engineering. Students learn the fundamental data requirements for designing a computer program that simulates a water resources engineering application, such as drought, rainfall, or surface-runoff prediction. The module includes the following topics: • Introduction to applications of artificial intelligence in water resources engineering • Introduction to Python and how to program with it • Apply machine-learning algorithms such as ANN, SVM, Random Forest, and XGBoost. • Train students to evaluate model performance using indicators such as R², RMSE, MAE, and NSE, compare models, and select the best-performing model. • Build simplified artificial-intelligence models for hydrological applications.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The principal strategy adopted in delivering this module is to encourage students' participation in learning the fundamentals of programming using Python while programming selected functions. This will be achieved through classroom instruction, interactive educational programs, and consideration of challenging problems to stimulate students.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
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Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	First monthly Exam	5	20% (15)	2, 5, 7, 10, 11, 13	LO #1, 2 and 5
	Second monthly Exam	3	5% (5)	2, 8, 12	LO #1, 3, 4 and 5
Summative assessment	Class work	1	10% (10)	Continuous	All
	Final Exam	1	5% (5)	13	LO # 1, 2 and 5
Total assessment			100		

Delivery Plan (Weekly Syllabus) المناهج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to the use of artificial intelligence in water resources engineering.
Week 2	Introduction to Python.
Week 4-3	Applying Python to program simple mathematical problems.
Week 6-5	Description of selected artificial-intelligence functions used in water resources engineering applications.
Week 7-6	Train students to evaluate model performance using indicators such as R^2 , RMSE, MAE, and NSE, compare models, and select the best-performing model.
Week 9-8	Detailed introduction to the types of data required and how to handle them when designing a computer program that simulates a water resources engineering problem.
Week 10-15	Build a mathematical model to simulate a water resources engineering problem, such as predicting rainfall, temperature, and surface runoff.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1-Abrahart, R. J., See, L. M., & Solomatine, D. P. (Eds.). (2008). Practical Hydroinformatics: Computational Intelligence and Technological Developments in Water Applications. Springer. 2-VanderPlas, J. (2016). Python Data Science Handbook: Essential Tools for Working with Data. O'Reilly Media.	No
Recommended Texts	ovindaraju, R. S., & Rao, A. R. (Eds.). (2000). Artificial Neural Networks in Hydrology. Springer.	No
Websites	https://www.w3schools.com/python/	

Grading Scheme

مخطط الدرجات

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