

First Level

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematics I		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	DWRE 111		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	UG1	Semester of Delivery	1
Administering Department	Dams and Water Resources Department	College	College of Engineering
Module Leader	Dr. Ahmed Ali Mohammed	e-mail	a.alogaidi@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	
Peer Reviewer Name	Dr. Omer Miqdad Abdulgani	e-mail	o.agha@uomosul.edu.iq
Scientific Committee Approval Date	01/06/2025	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 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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	It is expected from the student who passes this module learn the following topics: 1. An Overview of the derivatives. 2. Integration. 3. Indefinite integral. 4. Integration by substitution. 5. The definite integral. 6. Evaluating definite integrals by substitution. 7. Applications of the definite integral. 8. Area between two curves. 9. Volumes by slicing; disks and washers. 10. Volumes by cylindrical shells. 11. Length of a plane curve. 12. Area of a surface of revolution. 13. Graph of Hyperbolic Functions . 14. Derivatives and Integrals of Hyperbolic Functions. 15. Hopital's Rule.
Indicative Contents المحتويات الإرشادية	An Overview of the derivatives. [6 hr] Integration. [6 hr] Indefinite integral. [6 hr] Integration by substitution. [6 hr] The definite integral. [6 hr] Evaluating definite integrals by substitution. [6 hr] Applications of the definite integral. [6 hr] Area between two curves. [6 hr] Volumes by slicing; disks and washers. [6 hr] Volumes by cylindrical shells. [6 hr] Length of a plane curve. [6 hr] Area of a surface of revolution. [6 hr] Graph of Hyperbolic Functions. [6 hr] Derivatives and Integrals of Hyperbolic Functions. [6 hr] Hopital's Rule. [6 hr]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

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, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	0	0% (0)		
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	60% (60)	16	All

Total assessment		100% (100 Marks)		
Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري				
	Material Covered			
Week 1	An Overview of the derivatives.			
Week 2	Integration.			
Week 3	Indefinite integral + (quiz 1)			
Week 4	Integration by substitution + The definite integral.			
Week 5	Monthly Exam 1			
Week 6	Evaluating definite integrals by substitution			
Week 7	Applications of the definite integral.			
Week 8	Area between two curves + (quiz 2)			
Week 9	Volumes by slicing; disks and washers.			
Week 10	Volumes by cylindrical shells + (quiz 3)			
Week 11	Length of a plane curve + Area of a surface of revolution.			
Week 12	Monthly Exam 2			
Week 13	Graph of Hyperbolic Functions .			
Week 14	Derivatives and Integrals of Hyperbolic Functions.			
Week 15	Hopital's Rule.			
Week 16	Preparatory week before the final Exam			

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	-
Week 2	-
Week 3	-
Week 4	-
Week 5	-
Week 6	-
Week 7	-

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	o Calculus I By: Thomas	Yes
Recommended Texts	Calculus I By: Thomas 2018	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	Engineering mechanics I		Module Delivery		
Module Type	B		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	DWRE 112				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		UG1	Semester of Delivery		Fall
Administering Department		DWRE	College	Engineering	
Module Leader	Dr. Laith Khalil Ibrahim Al-Taie		e-mail	Laith.altaie@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification		Ph.D.
Module Tutor			e-mail		
Peer Reviewer Name		Anmar A.M. Al-Talib	e-mail	Anmar.altalib@uomosul.edu.iq	
Scientific Committee Approval Date		14/06/2023	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	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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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.
Indicative Contents المحتويات الإرشادية	• Principles of statics [6 hr] 1-basic concepts 2- vector and non-vector quantities 3- Units and their conversion • Force systems and their result [24 hr] 1-Force system 2- Analysis 3- Result of the converging forces 4- Moment force 5- Doubles 6- The result of non-converging forces • Equilibrium [18 hr] 1-concept of Equilibrium 2- free body diagram 3- Balance of parallel forces 4 - Equilibrium of bodies on which non-converging forces are applied • Trusses and Frames [42 hr] 1-Trusses A- Joints method B – Section method 2-Frames

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 homework assignments.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.5

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175
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Module Evaluation تقييم المادة الدراسية					
		Time/N umber	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes (Q)	4	20% (20)	4, 6, 11, 14	LO #Q1: 1-2, Q2: 5-6, Q3: 7-9, Q4: 10-13
	Assignments (A)	4	20% (20)	3, 5, 10, 13	LO #A1: 1-2, A2: 5-6, A3: 7-9, A4: 10-13
	Projects / Lab.	-	-	-	-
	Report	-	-	-	-
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Principles of statics, 1-basic concepts, 2- vector and non-vector quantities, 3- Units and their conversion
Week 2	Force systems and their result. 1-Force system, 2- Analysis,
Week 3	3- Result of the converging forces, 4- Moment force,
Week 4	5- Doubles, Problem solving + Quiz 1
Week 5	6- The result of non-converging forces
Week 6	Equilibrium. 1-concept of Equilibrium, 2- free body diagram, 3- Balance of parallel forces + Quiz 2
Week 7	4 - Equilibrium of bodies on which non-converging forces are applied
Week 8	Mid-term Exam + introduction about Trusses and Frames
Week 9	Trusses and Frames. 1-Trusses: A- Joints method part 1
Week 10	1-Trusses: A- Joints method part 2 + Quiz 3
Week 11	Trusses: B – Section method part 1
Week 12	Trusses: B – Section method part 2 + Problem solving
Week 13	2-Frames part 1
Week 14	2-Frames part 2 + Quiz 4
Week 15	Problem solving
Week 16	Preparatory week before the final Exam – review or open session for general questions

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	الميكانيك الهندسي – الجزء الأول – الاستاتيكا. وزارة التعليم العالي والبحث العلمي.	Yes
Recommended Texts	Engineering Mechanics: Statics & Dynamics, 2022, Russell C. Hibbeler	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	Engineering Drawing		Module Delivery		
Module Type	Basic		☐ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	DWRE 113				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UG1	Semester of Delivery		1
Administering Department		DWRE	College	COE	
Module Leader	Dr. Ahmed A. M. Al-Ogaidi		e-mail	a.alogaidi@uomosul.edu.iq	
Module Leader’s Acad. Title		Lecturer	Module Leader’s Qualification		Ph.D.
Module Tutor	Mays Ibrahim, Zeyad Taher		e-mail	mays.ibrahim.alsaidi@uomosul.edu.iq ziyad.ali@uomosul.edu.iq	
Peer Reviewer Name		Dr. Anmar Altalib	e-mail	anmar.altalib@uomosul.edu.iq	
Scientific Committee Approval Date		01/06/2023	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	1. To inform students about the importance of engineering drawing and the essential instruments. 2. To teach students different types of lines. 3. To teach students the basic geometrical constructions.

	4. To introduce students to multi view drawing via theory of projection. 5. To teach students 3D drawing based on Isometric concept. 6. To imagine the complicated bodies by drawing sectional view.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	In DWRE 112, initially students will learn how to use the engineering instruments to draw many things by different styles. Upon successful completion of this course, the student shall be able to: 1. Use the drawing instruments perfectly. 2. Recognize the types of line and their uses. 3. Draw various geometric shapes depending on geometrical constructions. 4. Understand the theory of projection to draw the views of a certain body. 5. Draw a 3D shape from given views. 6. Draw sectional views to illustrate the hidden features.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: <u>Introduction to Engineering Drawing</u> Introduction; types of pencils; engineering instruments; layout of drawing sheet. [3 hrs] <u>Types of lines</u> Visible line; hidden line; cutting line; center line; dimension line; extension line. [3 hrs] <u>Basic geometrical constructions</u> Basic concepts in engineering drawing such as drawing a circle arc of a certain radius tangent to two lines or tangent to two circles, drawing a reverse curve, drawing a perpendicular and bisector line to a certain line, dividing a line into any number of parts, drawing a bisector to a certain angle, drawing ellipse and parabola. [24 hrs] <u>Orthographic projection</u> Explanation of theory of projection and illustration of many problems by drawing their Multi-views. [24 hrs] <u>Isometric Drawing</u> Teaching students the techniques of drawing in 3D format from given projections. [24 hrs] <u>Sectional views</u> Types of sectional views, webs in sections, rotation of axes, lugs in section, spokes in section. [12 hrs]

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.

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	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3.8
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	4	16% (16)	4, 9, 12, 15	LO #3 – 6
	Assignments	14	12% (12)	2 – 14	LO #2 – 6
	Lab. (Classwork)	10	14% (14)	2 – 14	All
Summative assessment	Midterm Exam	2 hr	18% (18)	10	LO #1-4
	Final Exam	3 hr	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
Week	Material Covered

Week 1	Introduction to Engineering Drawing: Introduction; types of pencils; engineering instruments; layout of drawing sheet. Types of lines: Visible line; hidden line; cutting line; center line; dimension line; extension line.
Weeks 2-5	Basic geometrical constructions: Basic concepts in engineering drawing such as drawing a circle arc of a certain radius tangent to two lines or tangent to two circles, drawing a reverse curve, drawing a perpendicular and bisector line to a certain line, dividing a line into any number of parts, drawing a bisector to a certain angle, drawing ellipse and parabola.
Weeks 5-9	Orthographic projection: Explanation of theory of projection and illustration of many problems by drawing their Multi-views.
Weeks 10-13	Isometric Drawing: Teaching students the techniques of drawing in 3D format from given projections.
Weeks 14 & 15	Sectional views: Types of sectional views, webs in sections, rotation of axes, lugs in section, spokes in section.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)		
المنهاج الاسبوعي للمختبر		
Week	Material Covered	
Weeks 2-5	Labs 1 – 4, Basic geometrical constructions: Basic concepts in engineering drawing such as drawing a circle arc of a certain radius tangent to two lines or tangent to two circles, drawing a reverse curve, drawing a perpendicular and bisector line to a certain line, dividing a line into any number of parts, drawing a bisector to a certain angle, drawing ellipse and parabola.	
Weeks 5-9	Labs 5 – 8, Orthographic projection: Explanation of theory of projection and illustration of many problems by drawing their Multi-views.	
Weeks 10-13	Labs 9 – 12, Isometric Drawing: Teaching students the techniques of drawing in 3D format from given projections.	
Weeks 14 & 15	Labs 13– 14, Sectional views: Types of sectional views, webs in sections, rotation of axes, lugs in section, spokes in section.	
Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	French, T.E., Vierck, C.J. and Hang, R.I., 1978. The Fundamentals of Engineering Drawing and Graphic Technology. McGraw-Hill.	Yes

Recommended Texts	• Morling, K., 2010. Geometric and Engineering Drawing 3E. Routledge. • Hanifan, R., 2014. Perfecting engineering and technical drawing: Reducing errors and misinterpretations (Vol. 139). Springer. • الرسم الهندسي، عبد الرسول الخفاف، الجامعة التكنولوجية، مركز التعريب والنشر، بغداد، 1986.	No
Websites	https://www.coursera.org/search?query=engineering%20drawing	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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	C - Good	جيد	70 - 79	Sound work with notable 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	Arabic Language		Module Delivery	
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOM101			
ECTS Credits	4			
SWL (hr/sem)	50			
Module Level	UGI	Semester of Delivery		1
Administering Department	STAT	College	CSM	
Module Leader	Dr. khalid ali sulaiman		e-mail	Khalid.a.s@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Lecturer		Module Leader's Qualification	PhD
Module Tutor			e-mail	
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date	10/2/2026		Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	To become familiar with the history of the Arabic language in terms of its origin, the theories concerning its emergence, and the tribe to which it is attributed. To learn the rules for writing numbers, including their masculine and feminine forms. To identify common linguistic errors made by speakers and writers ("Say, not say" expressions). To understand the meanings and uses of Arabic prepositions. To learn the rules governing the writing of Hamzat al-Wasl and Hamzat al-Qaṭ' (connecting and hamzas). To become familiar with the Arabic grammatical particles (al-Nawāsikh) and their functions. To learn the rules for writing the tied tā' (Tā' Marbūṭah) and the open tā' (Tā' Maftūḥah). To identify the subject (Mubtada') and the predicate (Khabar) in Arabic sentences. To recognize common grammatical errors and learn how to correct them. To distinguish between the letters Zā' (ظ) and Dād. (ض) To become familiar with punctuation marks and their correct usage. To understand the orthographic rules of the separating alif (Alif al-Fāriqah) and its positions in writing. To understand the formal features and structure of administrative correspondence. To become familiar with the different periods of Arabic literary history. To recognize the importance and distinctive characteristics of the Arabic language
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	To enable students to understand the history of the Arabic language, including its origins, the theories concerning its emergence, and the tribe to which it belongs. To enable students to understand Arabic numerals with regard to gender agreement (masculine and feminine forms). To enable students to recognize common linguistic errors and avoid making them. To enable students to understand the meanings and functions of Arabic prepositions. To enable students to learn the rules governing the use of Hamzat al-Wasl and Hamzat al-Qaṭ'. To enable students to become familiar with the grammatical particles (al-Nawāsikh). To enable students to learn the rules for writing the tied Tā' (Tā' Marbūṭah) and the open Tā' (Tā' Maftūḥah).

	To enable students to understand the grammatical concepts of the subject (Mubtada') and the predicate (Khabar).(To enable students to identify grammatical errors. To enable students to distinguish between the Arabic letters Zā' (ظ) and Dād.(ض) To enable students to learn the correct use of punctuation marks. To enable students to understand Alif al-Fāriqah and the contexts in which it is used. To enable students to learn the formal aspects of administrative writing. To enable students to understand the different periods of Arabic literary history. To enable students to appreciate the importance of the Arabic language.
Indicative Contents المحتويات الإرشادية	To become familiar with the history of the Arabic language, including its origins, the theories concerning its emergence, and the tribes to which it is not attributed. To identify the rules of Arabic numerals, particularly with regard to masculine and feminine forms. To recognize common language errors and avoid them. To understand the meanings and functions of Arabic prepositions. To learn the rules governing the writing of Hamzat al-Wasl and Hamzat al-Qat'. To acquire knowledge of Arabic grammatical particles (al-Nawāsikh.(To learn the rules for writing the tied tā' (tā' marbūṭah) and the open tā' (tā' maftūḥah.(To understand the concepts of the subject (al-Mubtada') and the predicate (al-Khabar).(To identify and correct common grammatical errors. To distinguish between the Arabic letters Zā' (ظ) and Dād.(ض) To learn the rules governing the use of punctuation marks. To learn the rules for writing the distinguishing alif (alif al-fāriqah) and its proper positions. To learn the formal conventions of administrative correspondence. To become familiar with the major periods of Arabic literature. To become familiar with the history of the Arabic language.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	. The primary strategy adopted in delivering this module is to encourage students to actively participate in speaking and writing Arabic accurately and effectively, while

	simultaneously developing and enhancing their critical thinking skills. This will be achieved through interactive lectures and educational activities, as well as by engaging students in simple practical exercises and selected learning activities that stimulate their interest and promote active participation.
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب لـ ١٥ أسبوعا لكل فصل			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب 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 الفصلين	50		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	History of the Arabic Language

Week 2	Numbers: Masculine and Feminine Forms
Week 3	Common Linguistic Errors
Week 4	Meanings and Functions of Arabic Prepositions
Week 5	Hamzat al-Qaṭ' and Hamzat al-Waṣl
Week 6	Rules for Writing Tā' Marbūṭah and Tā' Maftūḥah
Week 7	Review and Examination
Week 8	Writing Hamzat al-Waṣl and Hamzat al-Qaṭ'
Week 9	Common Grammatical Errors and Their Correction
Week 10	The Difference between Ḍād (ض) and Zā' (ظ)
Week 11	Formal Aspects of Administrative Writing
Week 12	Alif al-Fāriqah and Its Uses
Week 13	Punctuation Marks
Week 14	Major Literary Periods
Week 15	History of the Arabic Language
Week 16	Final Examination

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Collective Authors. Arabic Language for Non-Specialists.	No
Recommended Texts	Al-Manhaj fi al-Qawā'id wa al-I'rāb, by Muhammad al-Antaki.	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	Introduction to Water Resources Engineering			Module Delivery		
Module Type	Core			☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	DWRE 115					
ECTS Credits	4					
SWL (hr/sem)	100					
Module Level		UG1	Semester of Delivery		1	
Administering Department		Dam and Water Resources Engineering (DWRE)		College	College of Engineering	
Module Leader	Abdulghani Khalaf Mohammed		e-mail	Alrobaai1982@uomosul.edu.iq		
Module Leader’s Acad. Title		Assistant Lecturer		Module Leader’s Qualification		M.Sc.
Module Tutor	Arwa Abdalrazzaq		e-mail	arwa.abdalrazzaq@uomosul.edu.iq		
Peer Reviewer Name		Dr. Anmar Abdulazeez Al Talib		e-mail	anmar.altalib@uomosul.edu.iq	
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	- 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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- The course helps the student to understand the content of the three disciplines of dams and water resources engineering (irrigation, drainage, hydrology, and hydraulics). - The course paves the way for students to study the properties of soil and the movement of water in it. - The course represents the starting line for the study of hydrology and the water cycle in nature and its distribution above and below the soil surface. - After completing this course, the student will be qualified to study the movement of water and other fluids in pipes and open channels and everything related to hydraulics.
Indicative Contents المحتويات الإرشادية	This course is considered one of the important courses for students of the Department of Dams and Water Resources Engineering, where the student is introduced to the most important principles of the branches of water resources (irrigation and drainage, hydraulics, hydrology). In addition to introducing the student to the most important water resources projects and hydraulic facilities in Iraq, where the course includes topics next: - hydrological cycle (12hr). - Dams and reservoirs/Hydraulic Structures/Floods (12hr). - Methods for measuring flow in open channels and pipes(10hr). - Soil-water-plant relationship(12hr). - Consumptive use (8hr). - irrigation methods (10hr). - irrigation efficiency (8hr). - Water sources in Iraq (8hr). - Control and storage projects(8hr) - Executed large dams(6hr). - Irrigation projects in Iraq(6hr).

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	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
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	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.
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعياً	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (10)	5, 10,13	LO #1, 2 and 3
	Assignments	3	15% (10)	3, 7,12	LO #1, 2 and 3
	Projects / Lab.	0	0% (10)		
	Report	1	10% (10)	13	LO #1, 2 and 3
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO #1and 2
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	introduction to the course, with an explanation of the curriculum vocabulary and scientific sources.

Week 2	Phases of the hydrological cycle/ Irrigation water sources/ Floods.
Week 3	Dams and reservoirs / Types of Water reservoirs.
Week 4	Types of dams /catchment area Classification of dams.
Week 5	Hydraulic Structures/ Methods for measuring flow in open channels and pipes.
Week 6	Volumetric Measurements for discharge Measurement/ Velocity-Area Method for discharge Measurement/ Hydraulic Structures for discharge Measurement
Week 7	Soil physical properties.
Week 8	Soil water forms/ Soil moisture content conventions/ Soil moisture content.
Week 9	irrigation efficiency/Water conduction efficiency/ water and consistency of distribution
Week 10	Surface irrigation/sprinkler irrigation/ drip irrigation.
Week 11	Estimation of water consumption/ Evapotranspiration/ yield coefficient.
Week 12	Water sources in Iraq.
Week 13	Control and storage projects.
Week 14	Executed large dams.
Week 15	Irrigation projects in Iraq.
Week 16	Preparatory week before the final Exam

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

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Irrigation and drainage book in Iraq and the Arab world. Written by Dr. Najeeb Kharofa, Dr. Mahdi Al-Sahhaf, Dr. Wafiq Al-Khashab	Yes
Recommended Texts	On-farm irrigation systems engineering\by A.Y.Hachum, and H.I.Yasin. textbook- Mosul University,1992.	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	Computer 1			Module Delivery		
Module Type	Basic			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	UOM 1031					
ECTS Credits	3					
SWL (hr/sem)	75					
Module Level		1	Semester of Delivery		1	
Administering Department		Dam and Water Resources Engineering (DWRE)		College	College of Engineering	
Module Leader	Dr. Talal Ahmed Basheer			e-mail	t.basheer@uomosul.edu.iq	
Module Leader’s Acad. Title		Lecturer		Module Leader’s Qualification		Ph.D.
Module Tutor	Omar Kanaan Taha			e-mail	omar.alsultan@uomosul.edu.iq	
Peer Reviewer Name		Dr. Omar Muqdad Abdulgany		e-mail	o.agha@uomosul.edu.iq	
Scientific Committee Approval Date				Version Number	2.0	

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

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

مخرجات التعلم للمادة الدراسية	strategies. 3. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. It is expected from the student who passes this module learn the following topics: 1. Introduction to Computer 2. Computer Components 3. Operating System and Graphical User Interface GUI 4. Word Processing 5. Spread Sheet 6. Presentation Software 7. Introduction to Internet and Web Browsers 8. Communications and Emails 9. Computer Troubleshooting
Indicative Contents المحتويات الإرشادية	Introduction to Computer [4 hr] Computer Components [8 hr] Operating System and Graphical User Interface GUI [8 hr] Word Processing [8 hr] Spread Sheet [8 hr] Presentation Software [8 hr] Introduction to Internet and Web Browsers [4 hr] Communications and Emails [4 hr] Computer Troubleshooting [4 hr]

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

	students.
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	12	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعياً	0.8
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	75		

Module Evaluation					
تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (5)	4, 11	LO #Q1: 1-2, Q2: 7-9
	Assignments	2	10% (5)	3, 10	LO #A1: 1-2, A2: 7-9
	Lab. Exam	1	10% (10)	14	All
	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	2 hr	10% (10)	9	LO # 1-5
	Final Exam	3hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	Introduction to Computer: Concepts of Hardware and Software with their components; Concept of Computing, Data and Information; Applications of Information Electronics and Communication Technology (IECT); Connecting input/output devices, and peripherals to CPU.

Week 2, 3	Computer Components: Computer Portions, Hardware Parts, I/O Units, Memory Types, Basic CPU Components, Computer Ports, Personal Computer, Personal Computer (Features and Types)
Week 4, 5	Operating System and Graphical User Interface GUI: Operating System; Basics of Common Operating Systems; The User Interface, Using Mouse Techniques; Use of Common Icons, Status Bar, Using Menu and Menu-selection, Concept of Folders and Directories, Opening and closing of different Windows; Creating Short cuts.
Week 6, 7	Word Processing: WordProcessing Basics; Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus; Printing of word document.
Week 8, 9	Spread Sheet: Basics of Spreadsheet; Manipulation of cells; Formulas and Functions; Editing of Spread Sheet, printing of Spread Sheet.
Week 10, 11	Presentation Software: Basics of presentation software; Creating Presentation; Preparation and Presentation of Slides; Slide Show; Taking printouts of presentation / handouts.
Week 12	Introduction to Internet and Web Browsers: Computer networks Basic; LAN, WAN; Concept of Internet and its Applications; connecting to Internet; World Wide Web; Web Browsing software's, Search Engines; Understanding URL; Domain name; IP Address.
Week 13	Communications and Emails: Basics of electronic mail; Getting an email account; Sending and receiving emails; Accessing sent emails; Using Emails; Document collaboration.
Week 14	Computer Troubleshooting: Identifying and solving common hardware and software problems that computer users encounter. Basic troubleshooting techniques and tools for diagnosing and resolving issues.
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1	Introduction to Computer: Concepts of Hardware and Software with their components; Concept of Computing, Data and Information; Applications of Information Electronics and Communication Technology (IECT); Connecting input/output devices, and peripherals to CPU.
Week 2, 3	Computer Components: Computer Portions, Hardware Parts, I/O Units, Memory Types, Basic CPU Components, Computer Ports, Personal Computer, Personal Computer (Features and Types)
Week 4, 5	Operating System and Graphical User Interface GUI: Operating System; Basics of Common Operating Systems; The User Interface, Using Mouse Techniques; Use of Common Icons, Status Bar, Using Menu and Menu-selection, Concept of Folders and Directories, Opening and closing of different Windows; Creating Short cuts.
Week 6, 7	Word Processing: WordProcessing Basics; Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus;

	Printing of word document.
Week 8, 9	Spread Sheet: Basics of Spreadsheet; Manipulation of cells; Formulas and Functions; Editing of Spread Sheet, printing of Spread Sheet.
Week 10, 11	Presentation Software: Basics of presentation software; Creating Presentation; Preparation and Presentation of Slides; Slide Show; Taking printouts of presentation / handouts.
Week 12	Introduction to Internet and Web Browsers: Computer networks Basic; LAN, WAN; Concept of Internet and its Applications; connecting to Internet; World Wide Web; Web Browsing software's, Search Engines; Understanding URL; Domain name; IP Address.
Week 13	Communications and Emails: Basics of electronic mail; Getting an email account; Sending and receiving emails; Accessing sent emails; Using Emails; Document collaboration.
Week 14	Computer Troubleshooting: Identifying and solving common hardware and software problems that computer users encounter. Basic troubleshooting techniques and tools for diagnosing and resolving issues.

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

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

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

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

Module Information				
معلومات المادة الدراسية				
Module Title	Geology		Module Delivery	
Module Type	Support or related learning activity		☐ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	DWRE 117			
ECTS Credits	3			
SWL (hr/sem)	75			
Module Level		UG1	Semester of Delivery	1
Administering Department		Dams and Water Recourses	College	Engineering
Module Leader	Muhanad Talal Yousif		e-mail	Mohanad_ALsheer@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 Altalib	e-mail	Anmar.altalib@uomosul.edu.iq
Scientific Committee Approval Date		10/06/2023	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	1. To understand the types of Rocks and Engineering properties 2. Define hydrogeology and Hydrologic budget 3. Distinguish between Types of aquifers 4. This course deals with the basic concept of Geologic formations as aquifers. 5. Calculate Porosity of rocks or soils in aquifers, groundwater movement,

	Permeability and Hydraulic Conductivity
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Discrimination between types of Rocks 2. Describe the hydrogeology and Hydrologic budget. 3. Identify aquifers and Distinguish between them. 4. Explanation the basic concept of Geologic formations for aquifers. 5. Define the Porosity of rocks or soils in aquifers and groundwater movement. 6. Apply Darcy equation to Calculate the Hydraulic Conductivity
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Earth's crust and components of the earth's crust, minerals and crystals, Igneous rocks, Metamorphic rocks, sedimentary rocks [12 hrs] Erosion, sculpting and soil formation, geological structures, Engineering properties of rocks, Mechanical properties of rocks [16 hrs] Introduction to hydrogeology, Rock properties affecting groundwater, Types of aquifers, Geologic formations as aquifers [16 hrs] Porosity of rocks or soils in aquifers, groundwater movement, Permeability and Hydraulic Conductivity [12 hrs]
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 exercises involving some problems that are interesting to the students in Soil, Rocks and the water move underground scope.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem)	48	Structured SWL (h/w)	4

الحمل الدراسي المنتظم للطلاب خلال الفصل		الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	27	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (15)	2, 6, 12	LO #1, 2, and 4
	Assignments	5	15% (15)	1, 4, 7, 11, 14	LO # 3, 4, 5 and 6
	Report	1	10% (10)	13	LO # 3 and 4
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Earth's crust and components of the earth's crust, minerals and crystals
Week 2	Igneous rocks
Week 3	Metamorphic rocks, sedimentary rocks
Week 4	Erosion, sculpting and soil formation
Week 5	geological structures
Week 6	Engineering properties of rocks
Week 7	Mechanical properties of rocks
Week 8	Introduction to hydrogeology
Week 9	Hydrologic budget
Week 10	Rock properties affecting groundwater
Week 11	Types of aquifers

Week 12	Geologic formations as aquifers				
Week 13	Porosity of rocks or soils in aquifers				
Week 14	groundwater movement				
Week 15	Permeability and Hydraulic Conductivity				
Learning and Teaching Resources					
مصادر التعلم والتدريس					
	Text			Available in the Library?	
Required Texts	1- “Basic Ground-Water Hydrology”. RALPH C. HEATH. Prepared in cooperation with the North Carolina Department of Natural Resources and Community Development. Tenth printing, 2004. 2- 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. 3- “Groundwater Hydrology”. K.R. Rushton. 2003 John Wiley & Sons Ltd, the Atrium, Southern Gate, Chichester. 4- “The Handbook of Groundwater Engineering”. John H. Cushman, Daniel M. Tartakovsky. Published online on: 07 Nov 2016.			yes	
Recommended Texts	1- “STUDY GUIDE FOR A BEGINNIN-G COURSE IN GROUND-WATER HYDROLOGY” PART II. by O. Lehn Franke, Thomas E. Reilly, Ralph J. Haefner, and Dale L. Simmons. U.S. GEOLOGICAL SURVEY. Reston, Virginia 1993.			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	Mathematics II		Module Delivery		
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	DWRE 121				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		UG1	Semester of Delivery		2
Administering Department		Dams and Water Resources Department	College	College of Engineering	
Module Leader	Ahmed Yahya Abdulhafedh		e-mail	ahmed.Abdulhafedh@uomosul.edu.iq	
Module Leader’s Acad. Title		Assistant Lecturer	Module Leader’s Qualification		Ms.c.
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Dr. Anmar Altalib	e-mail	Anmar.altalib@uomosul.edu.iq	
Scientific Committee Approval Date		01/06/2023	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	Matrices and determinants, Transcendental Functions, Inverse Functions, Derivatives and integral of inverse trigonometric functions, Exponential and logarithmic functions, Derivatives and integrals involving logarithmic and exponential functions, Graphs and applications involving logarithmic and exponential functions, Hyperbolic functions, Hopital's Rule, An overview of integration methods: Trigonometric

	substitutions, Trigonometric integral, Integration by parts, Integrating rational functions by partial fractions, Numerical integration; Simpson's rule.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	It is expected from the student who passes this module learn the following topics: 1. Matrices and determinants. 2. Transcendental Functions. 3. Inverse Functions. 4. Derivatives and integral of inverse trigonometric functions. 5. Exponential and logarithmic functions. 6. Derivatives and integrals involving logarithmic and exponential functions. 7. Graphs and applications involving logarithmic and exponential functions. 8. Hyperbolic functions. 9. Hopital's Rule. 10. An overview of integration methods: 11. Trigonometric substitutions. 12. Trigonometric integral. 13. Integration by parts. 14. Integrating rational functions by partial fractions. 15. Numerical integration; Simpson's rule.
Indicative Contents المحتويات الإرشادية	Matrices and determinants. [6 hr] Transcendental Functions. [6 hr] Inverse Functions. [6 hr] Derivatives and integral of inverse trigonometric functions. [6 hr] Exponential and logarithmic functions. [6 hr] Derivatives and integrals involving logarithmic and exponential functions. [6 hr] Graphs and applications involving logarithmic and exponential functions. [6 hr] Hyperbolic functions. [6 hr] Hopital's Rule. [6 hr] An overview of integration methods: [6 hr] Trigonometric substitutions. [6 hr] Trigonometric integral. [6 hr]

	Integration by parts. [6 hr]
	Integrating rational functions by partial fractions. [6 hr]
	Numerical integration; Simpson's rule. [6 hr]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي 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	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	0	0% (0)	0	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	Matrices and determinants.
Week 2	Transcendental Functions.
Week 3	Inverse Functions.
Week 4	Derivatives and integral of inverse trigonometric functions + (quiz 1)
Week 5	Exponential and logarithmic functions.
Week 6	Derivatives and integrals involving logarithmic and exponential functions.
Week 7	Graphs and applications involving logarithmic and exponential functions+ Hyperbolic functions.
Week 8	Monthly Exam 1
Week 9	Hopital's Rule + (quiz 2)
Week 10	An overview of integration methods:
Week 11	Trigonometric substitutions + Trigonometric integral.
Week 12	Integration by parts + (quiz 1)
Week 13	Integrating rational functions by partial fractions.
Week 14	Monthly Exam 2
Week 15	Numerical integration; Simpson's rule.
Week 16	Preparatory week before the final Exam

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

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Calculus I By: Thomas	Yes
Recommended Texts	Calculus I By: Thomas 2018	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	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	Engineering mechanics II		Module Delivery		
Module Type	B		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	DWRE 122				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UG1	Semester of Delivery		2
Administering Department		DWRE	College	Engineering	
Module Leader	Dr. Laith Khalil Ibrahim Al-Taie		e-mail	Laith.altaie@uomosul.edu.iq	
Module Leader’s Acad. Title		Lecturer	Module Leader’s Qualification		Ph.D.
Module Tutor			e-mail		
Peer Reviewer Name		Anmar A.M. Al-Talib	e-mail	Anmar.altalib@uomosul.edu.iq	
Scientific Committee Approval Date		14/06/2023	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	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. 5. To understand force distribution in trusses and frames. 6. To perform force analysis using the joint method and the section method.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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.
Indicative Contents المحتويات الإرشادية	• Friction 1- The nature of friction 2- mechanical friction 3- Coefficient of Friction 4- Friction issues 5- wedges 6- Frictional forces in the belts • Centers and Centers of Gravity 1- The importance of centers 2- Centers of spaces and lines 3- Determination of centers by integration 4- Centers of compound shapes • Moment of Inertia 1- Units of measurement and signals 2- The moment of polar inertia 3- swirl radius 4- The equation for transferring the moment of inertia 5- Moment of Inertia by Integration 6- The factorial of inertia 7- Maximum and minimum values of moment of inertia (Mohr circuit) • Kinematics of Particles 1- Rectilinear motion 2- Plane curvilinear motion

	3- Circular motion Kinetics of particles 1- Rectilinear motion 2- Dynamic friction Work and energy 1- Equations 2- Work and energy applications 3- Power 4- Efficiency
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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 homework assignments.

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

Module Evaluation تقييم المادة الدراسية				
As	Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome

Formative assessment	Quizzes (Q)	4	20% (20)	4, 6, 10, 14	LO #Q1: 1-3, Q2: 4-6, Q3: 8-10, Q4: 11-13
	Assignments (A)	4	20% (20)	3, 5, 10, 13	LO #A1: 1-2, A2: 5-6, A3: 7-9, A4: 10-13
	Projects / Lab.	-	-	-	-
	Report	-	-	-	-
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	Friction: The nature of friction, mechanical friction, Coefficient of Friction, Friction issues
Week 2	Friction: wedges, Frictional forces in the belts
Week 3	Centers and Centers of Gravity: The importance of centers, Centers of spaces and lines, Determination of centers by integration, Centers of compound shapes
Week 4	Problem solving + Quiz 1
Week 5	Moment of Inertia: Units of measurement and signals, The moment of polar inertia, swirl radius, The equation for transferring the moment of inertia,
Week 6	Moment of Inertia: Moment of Inertia by Integration, The factorial of inertia, Maximum and minimum values of moment of inertia (Mohr circuit) + Quiz 2
Week 7	Problem solving
Week 8	Mid-term Exam + introduction Kinematics of Particles
Week 9	Kinematics of Particles: Rectilinear motion, ,
Week 10	Kinematics of Particles: Plane curvilinear motion + Quiz 3
Week 11	Circular motion
Week 12	Dynamic friction + Problem solving
Week 13	Work and energy: Equations, Work and energy applications,
Week 14	Power, Efficiency + Quiz 4
Week 15	Problem solving

Week 16	Preparatory week before the final Exam – review or open session for general questions
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Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	الميكانيك الهندسي – الجزء الثاني – الدينامك. وزارة التعليم العالي والبحث العلمي.	Yes
Recommended Texts	Engineering Mechanics: Statics & Dynamics, 2022, Russell C. Hibbeler	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	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	Computer Drawing		Module Delivery		
Module Type	Basic		☐ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	DWRE 123				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UG1	Semester of Delivery		Spring
Administering Department		DWRE	College	COE	
Module Leader	Dr. Talal Ahmed Basheer		e-mail	t.basheer@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification		Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		01/06/2023	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 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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Distinguish how to use CAD programs to produce engineering drawings. 2. Benefit from AutoCAD software features to produce efficient drawings. 3. Acquire a knowledge to draw 2D drawings. 4. Acquire skill in modify 2D drawings. 5. Become competent in adding dimensions and text to the drawings. 6. Manage how to work with layers. 7. Accomplish printing the plans in an accurate geometric manner on paper. 8. Learn how to draw 3D drawings.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Introducing AutoCAD interface components, Types of Coordinate systems in AutoCAD, Drawing environment preparation Grid, Snap, Ortho [6 hrs] - Drawing commands: Line, Circle, Polygon, Rectangle, Point, Divide, Hatch, Text, Mtext [18 hrs] - Modify commands: Erase, Copy, Move, Mirror, Rotate, Scale, Offset, Rectangular and Polar Array, Stretch, Trim, Extend, Chamfer, Fillet, Explode [21 hrs] - Object Snap, Zoom, and Pan [6 hrs] - Layers and drawing element settings: Color, Linetype, Line Weight, Text Style [12 hrs] - Dimensions and measurements [6 hrs] - Printing and output [6 hrs] - Basics of 3D Drawings [12 hrs]

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 للطلاب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3.8
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	10% (10)	3, 10	LO # 3 and 4
	Assignments	2	10% (10)	5, 12	LO # 1-4
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 1-6
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-4
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Introduction - AutoCAD program interface elements, Coordinate systems in the program, Drafting Settings: Grid, Snap, Ortho
Week 2	Drawing commands: Line, Circle
Week 3	Drawing commands: Polygon, Rectangle
Week 4	Modify tools: Erase, Copy, Move
Week 5	Modify tools: Mirror, Rotate, Scale
Week 6	Object Snap, View – Zoom, View - Pan
Week 7	Modify tools: Offset, Rectangular and Polar Array
Week 8	Modify tools: Stretch, Trim, Extend
Week 9	Drawing Commands: Point, Divide, Hatch
Week 10	Drawing Commands: Text, Mtext
Week 11	Modify tools: Chamfer, Fillet, Explode
Week 12	Layers and drawing element settings: Color, Linetype, Line Weight, Text Style
Week 13	Dimensions and measurements
Week 14	Printing and output
Week 15	Basics of 3D Drawings
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1	Lab 1: Apply the command and materials that taken in the week #1 of the theoretical course.
Week 2	Lab 2: Apply the command and materials that taken in the week #2 of the theoretical course.
Week 3	Lab 3: Apply the command and materials that taken in the week #3 of the theoretical course.
Week 4	Lab 4: Apply the command and materials that taken in the week #4 of the theoretical course.
Week 5	Lab 5: Apply the command and materials that taken in the week #5 of the theoretical course.
Week 6	Lab 6: Apply the command and materials that taken in the week #6 of the theoretical course.
Week 7	Lab 7: Apply the command and materials that taken in the week #7 of the theoretical course.
Week 8	Lab 8: Apply the command and materials that taken in the week #8 of the theoretical course.

Week 9	Lab 9: Apply the command and materials that taken in the week #9 of the theoretical course.
Week 10	Lab 10: Apply the command and materials that taken in the week #10 of the theoretical course.
Week 11	Lab 11: Apply the command and materials that taken in the week #11 of the theoretical course.
Week 12	Lab 12: Apply the command and materials that taken in the week #12 of the theoretical course.
Week 13	Lab 13: Apply the command and materials that taken in the week #13 of the theoretical course.
Week 14	Lab 14: Apply the command and materials that taken in the week #14 of the theoretical course.
Week 15	Lab 15: Apply the command and materials that taken in the week #15 of the theoretical course.

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Al-Allaf, Emad Hani, Architectural and Computer Aided Engineering Drawing, 2D Drawing Principles in AutoCAD®, 2018.	Yes
Recommended Texts		
Websites	https://www.mycadsite.com	

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	Engineering Statistics		Module Delivery		
Module Type	B		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	DWRE124				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UG1	Semester of Delivery		2
Administering Department		DWRE	College	ENG	
Module Leader	Dr.Saleh Mohammed Saleh Zakaria		e-mail	s.zakaria@uomosul.edu.iq	
Module Leader’s Acad. Title		Lecturer	Module Leader’s Qualification		Ph.D.
Module Tutor	-----		e-mail	E-mail	
Peer Reviewer Name		Dr.Anmar Abdulaziz	e-mail	E-mail	
Scientific Committee Approval Date		12/06/2025	Version Number		1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The aim of this course is to introduce the students to the 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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. CLO-1: Recognize Nature of statistical data and symbols and distinguish among them. CLO-2: Ability to view Statistical data by tabuling and drawing method. CLO-3: Ability to Measure Statistical criteria. CLO-4: learn how to analysis of random phenomena. CLO-5: learn how to interpretation of probabilities as relative frequencies. CLO-6: Derivation of the null and alternative hypotheses based on the statistical data . CLO-7: Gaining experience in decision-making to accept or reject null and alternative hypohese CLO-8: Recognize different Statistical test and distinguish among them CLO-9: Apply the basic Engineering Statistics concepts to solve problems associated with Statistical test(Chi square test, T-test and F-test) CLO-10: Organizing the needed solution, drawing and calculation for the Regression and Correlation problems CLO-11:Preparing statistical reports, tabulating data and statistics, and providing appropriate solutions for two selected topics over the course period
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Introduction, Nature of statistical data, symbols and Measures</u> This part includes: Introduction, Nature of statistical data and symbols, Viewing the data, the table method, the drawing method. Measures of central tendency, the arithmetic mean, median, and mode Measures of the mean, dispersion, and range. The average deviation, variance, coefficient of variation. (20 hrs) <u>Part B – Principles of probability theory</u> This part includes: Principles of probability theory, conditional probability, Binomial distribution, and normal distribution. (16 hrs)

	Part C – Hypothesis Testing Approach& Statistical Tests This part includes: Hypothesis Testing Approach, statistical tests which include Z- test, Chi square test, F-test, Regression and correlation, the drawing method, the least squares method , the linear correlation. (24 hrs)
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Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	This course has several components that include lectures, individual & group assignments, and e-learning platforms. Exercises involving the use of computer applications tools to understand the engineering statistical processes. The course will be taught in English in addition to the Arabic, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب 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
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 3, 4, 5, 6, and 7
	Assignments	2	10% (10)	2, 14	LO # 3, 4, 8, 9 and 10
	Projects / Lab.	----	-----	-----	
	Report	2	10% (20)	6 and 11	LO # 5, 8 and 10
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	Introduction, Nature of statistical data and symbols,
Week 2	Viewing the data, the table method, the drawing method.
Week 3	Measures of central tendency, the arithmetic mean, median, and mode
Week 4	Measures of the mean, dispersion, and range.
Week 5	The average deviation, variance, coefficient of variation.
Week 6	Principles of probability theory
Week 7	Mid-term Exam + conditional probability.
Week 8	Binomial distribution .
Week 9	normal distribution.
Week 10	Hypothesis testing approach.
Week 11	Statistical tests , Z- test.
Week 12	Chi square test .
Week 13	F-test .
Week 14	Regression and correlation .
Week 15	the drawing method, the least squares method , the linear correlation.
Week 16	Preparatory week before the final Exam.

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

Week 5	
Week 6	
Week 7	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Introduction to Statistics, Dr. Khasha Mahmoud Al-Rawi, College of Agriculture and Forestry, University of Mosul, 2nd Edition, 2000.	Yes
Recommended Texts	An Introduction to the Science of Statistics: From Theory to Implementation, Preliminary Edition, Joseph C. Watkins	no
Websites	https://www.infobooks.org/free-pdf-books/math/statistics/	

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	Chemistry		Module Delivery		
Module Type	Support		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	DWRE 125				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UG1	Semester of Delivery		2
Administering Department		DWRE 125	College	Engineering	
Module Leader	Dr. Omar Muqdad Abdulgany		e-mail	O.gha@uomosul.edu.iq	
Module Leader’s Acad. Title		Asst.Prof.	Module Leader’s Qualification		Ph.D.
Module Tutor	Alaa A. Naser and Arwa		e-mail	E-mail	
Peer Reviewer Name		Anmar AL-talb	e-mail	E-mail	
Scientific Committee Approval Date		01/06/2025	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 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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of this course, the student will: 1. Be able to describe the chemical compositions of natural waters and understand the reasons behind their variations. 2. Have knowledge of the main sources of water pollution and the different types of pollutants. 3. Be able to calculate the changes in dissolved oxygen, oxygen deficit, and Biological Oxygen Demand (BoD) along the riverbed due to wastewater. 4. Be able to compute the impact of the quality and quantity of wastewater entering and leaving a lake. 5. Be able to identify the different types of pollution that can affect rivers. 6. Understand the properties of water sources and how they can become polluted. 7. Be able to identify the criteria for drinking water acceptability and describe the processes used to treat water for public water supply.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Environment [4 hrs] Hydrological Cycle of water from quantity sides. [4 hrs] Properties of water sources, how water sources polluted. Effect of engineering project on water quality and self-purification. [8 hrs] Effect of decomposition rate (decomposition constant) on the amount of oxygen required in the process of waste decomposition. [12 hrs] Calculate the change of dissolved oxygen, deficit oxygen and BoD along the riverbed

	due to wastewater. [12 hrs] Effect of the quality and quantity of wastewater entering and leaving the lake. [6 hrs] Seasonal inversion in lakes, Effect of detergents on the pollution of the water. [6hrs] Study the type of pollution on the river, Wastewater treatment.[8hr].
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	7.5% (7.5)	5, 10	LO #1, 2, 8,9 and 10
	Assignments	2	7.5% (7.5)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	15% (15)	Continuous	All
	Report	5	5% (5)	3,4,5,6,7,9	LO # 2, 3,4, 6,10 and 10
Summative assessment	Midterm Exam	2 hr	15% (15)	8	LO # 1-8
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	Introduction to Environment
Week 2	Hydrological Cycle of water from quantity sides. Quiz No.1
Week 3	Properties of water sources, how water sources polluted.
Week 4	Effect of engineering project on water quality and self-purification.
Week 5	Effect of decomposition rate (decomposition constant) on the amount of oxygen required in the process of waste decomposition
Week 6	Effect of decomposition rate (decomposition constant) on the amount of oxygen required in the process of waste decomposition
Week 7	Calculate the change of dissolved oxygen along the riverbed due to wastewater.
Week 8	Mid-term Exam
Week 9	Calculate the change of deficit oxygen along the riverbed due to wastewater.
Week 10	Calculate the change of BoD along the riverbed due to wastewater, Quiz No.2
Week 11	Effect of the quality and quantity of wastewater entering and leaving the lake.
Week 12	Effect of the quality and quantity of wastewater entering and leaving the lake.
Week 13	Seasonal inversion in lakes, Effect of detergents on the pollution of the water
Week 14	Study the type of pollution on the river.
Week 15	Wastewater treatment.

Week 16	Preparatory week before the final Exam
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Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1	Lab 1: Solids, Dissolved and Suspended solids, and total solids
Week 2	Lab 2: Turbidity
Week 3	Lab 3: PH-value.
Week 4	Lab 4: Electrical Conductivity.
Week 5	Lab 5: Dissolved Oxygen
Week 6	Lab 6: Hardness

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	د. طارق احمد محمود " علم و تكنولوجيا البيئة " كتاب منهجي لمادة هندسة البيئة – جامعة الموصل – كلية الهندسة.	Yes
Recommended Texts		
Websites		

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

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

Module Information					
معلومات المادة الدراسية					
Module Title	Democracy and Human Rights		Module Delivery		
Module Type	Support		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	UOM 1040				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		UG1	Semester of Delivery		three
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		01/07/2023	Version Number		1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aim of studying the democracy and human rights topics is to: 1. Understand the concept of human rights and explore their sources, including international, regional, national, and religious sources. 2. Define administrative corruption, explore its types, and understand its detrimental effects on society. Study methods to combat administrative

	corruption and promote transparency, accountability, and good governance. 3. Trace the historical development and evolution of human rights, examining key milestones and movements that have shaped the modern understanding of human rights. 4. Differentiate between different categories of human rights, including civil and political rights, economic and social rights, and environmental, cultural, and developmental rights. 5. Explore legal, institutional, and societal guarantees to prevent human rights violations, including guarantees of human rights in Islam, national-level protections, and international safeguards. 6. Comprehend the concept of democracy, including its principles, values, and various forms of democratic governance such as direct, semi-direct, indirect, and digital democracy. Overall, studying these topics aims to develop a comprehensive understanding of human rights, democracy, and combating corruption, empowering individuals to actively promote and protect human rights and democratic values in society.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After these module aims, students should be able to: 1. Demonstrate a comprehensive understanding of the concept of human rights and their sources, including international, regional, national, and religious sources. 2. Identify and explain the fundamental characteristics of human rights, such as universality, indivisibility, interdependence, and inalienability. 3. Analyze the historical emergence and evolution of human rights, including key milestones and movements that have shaped their development. 4. Differentiate between different categories of human rights, including civil and political rights, economic and social rights, and environmental, cultural, and developmental rights. 5. Evaluate and apply legal, institutional, and societal guarantees to prevent human rights violations, considering guarantees in Islam, at the national level, and within the international framework. 6. Understand and discuss the concept of democracy, including its principles, values, and different forms of democratic governance. 7. Evaluate the Islamic stance on democracy and engage in critical analysis of the strengths and weaknesses of the democratic system. 8. Recognize and assess the impact of administrative corruption on society and propose methods to combat and prevent corruption in administrative systems. 9. Demonstrate critical thinking skills by analyzing and evaluating different perspectives on human rights, democracy, and corruption. 10. Apply acquired knowledge and skills to promote and protect human rights,

	democracy, and good governance in personal, professional, and civic contexts. Overall, students should have a solid understanding of democracy and human rights, democracy, and corruption issues, and be able to apply this knowledge to contribute to the advancement of human rights and democratic values in society.
Indicative Contents المحتويات الإرشادية	The indicative content includes: 1. Definition and sources of democracy and human rights (international, regional, national, religious). [3h] 2. Characteristics of democracy and human rights: universality, indivisibility, interdependence, inalienability. [3h] 3. Emergence and evolution of human rights: historical development, key milestones, influential movements. [3h] 4. Types of human rights: civil and political, economic and social, environmental, cultural, and developmental. [3h] 5. Guarantees to prevent human rights violations: legal, institutional, societal safeguards, Islamic guarantees, national and international levels. [3h] 6. Concept of democracy: principles, values, forms of governance (direct, semi-direct, indirect). [3h] 7. Islamic stance on democracy: compatibility, strengths, weaknesses. [3h] 8. Critique of the democratic system: analysis of strengths and weaknesses. [3h] 9. Administrative corruption: definition, types, societal impact. [3h] 10. Methods to combat administrative corruption. [3h]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	When it comes to learning and teaching strategies for a human rights module, there are several approaches can be taken to enhance understanding and engagement. Here are some effective strategies: 1. Interactive Discussions: Encourage students to actively participate in discussions, debates, and group activities. This promotes critical thinking, allows for different perspectives to be shared, and fosters a deeper understanding of human rights issues. 2. Case Studies: Present real-life case studies that highlight human rights violations or achievements. Analyzing these cases helps students apply theoretical concepts to practical situations and develops their problem-

	solving skills. 3. Research Projects: Assign research projects on specific human rights topics or issues. This encourages independent learning, critical analysis, and the development of research skills. 4. Collaborative Learning: Foster collaboration among students through group projects or assignments. This encourages teamwork, peer learning, and the exchange of diverse perspectives. 5. Assessment Variety: Use a variety of assessment methods, including essays, presentations, debates, and quizzes, to assess students' understanding of human rights concepts and their ability to apply them to real-world situations.
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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 أسبوعياً	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation					
تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #2, 4, 6 and 8
	Assignments	2	10% (10)	3, 5, 8, 11, 13	LO # 1, 3, 7, 6, 9 and 10
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 2,4,5,7,9and 10
Summative	Midterm Exam	2 hr	10% (10)	7	LO # 1-7

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	Definition of human rights and sources of rights (international sources / regional sources / national sources / religious sources).
Week 2	Characteristics of human rights.
Week 3	The emergence and evolution of human rights.
Week 4	Types of human rights / civil and political rights. Economic and social rights. Environmental, cultural, and developmental rights.
Week 5	Guarantees to prevent human rights violations / guarantees of human rights in Islam.
Week 6	Guarantees for the protection of human rights at the national level.
Week 7	Guarantees of human rights at the international level.
Week 8	The concept of democracy.
Week 9	Characteristics of a democratic system.
Week 10	Forms of democratic governance (direct democracy / semi-direct democracy / indirect democracy).
Week 11	Digital democracy / definition and advantages and disadvantages of digital democracy / manifestations of digital democracy.
Week 12	The Islamic stance on democracy.
Week 13	Critique of the democratic system.
Week 14	Administrative corruption / definition and types.
Week 15	Methods to combat administrative corruption.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	ضمانات حقوق الانسان وحمايتها وفقا للقانون الدولي والتشريع الوطني / نبيل عبد الرحمن ناصر الدين	No
Recommended Texts	الديمقراطية وحقوق الانسان / د. امير عبد العزيز	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	English Language I		Module Delivery	
Module Type	Support		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOM 1021			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	1	Semester of Delivery		2
Administering Department	DWRE	College	COE	
Module Leader			e-mail	
Module Leader's Acad. Title			Module Leader's Qualification	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	14/06/2023		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	7. The main objective of this course is to emphasize the fundamental language skills of reading, writing, speaking, listening, thinking, viewing, and presenting. 8. The course includes studies of various literary genres: short story, novel, and non-fiction. 9. The course also helps students to improve their <i>English language grammar</i> and <i>reading</i> abilities, and becoming more effective use of grammar and natural self-expression in <i>English</i>.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	9. In this course the students will attain and enhance competence in the four modes of literacy: writing, speaking, reading and listening. 10. Students will heighten their awareness of correct usage of English grammar in writing and speaking. 11. Students will improve their speaking ability in English both in terms of fluency and comprehensibility. 12. Students will give oral presentations and receive feedback on their performance. 13. Students will increase their reading speed. 14. Students will improve their reading fluency skills through extensive reading. 15. Students will enlarge their vocabulary.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Grammars [20 hrs]</u> Basic Grammar in English: [7 hrs] - Parts of speech. - Basic English Sentence Structure. - Pronouns. - Tenses. Active and Passive Voice: [5 hrs] - Active voice. - Passive voice. - Convert from active voice to passive voice and vice versa. Comparative and Superlative: [2 hrs] - Positive, comparative and superlative. Conditional Sentences: [2 hrs] - Conditional sentences. - If-clauses type I, II, III. Dependent and Independent Clauses: [2 hrs]

	Simple, Compound, and Complex Sentences: [2 hrs]
	<u>Part B – Reading [15 hrs]</u> - This section involves reading a variety of literary genres, including short stories, novels, and nonfiction. - Reading some of passages from IELTS books. <u>Part C – Writing [15 hrs]</u> - In this part, students will learn to write simple topics and subjects about graphics and figures related to mechanical engineering subjects. - Writing some of topics and essay from IELTS books.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL) الحمل الدراسي للطلاب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	50		

Module Evaluation					
تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	4, 9, 12	LO #1, 2, 10 and 11
	Assignments	4	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.		0% (0)		
	Report	1	5% (5)	9	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1hr	15% (15)	8	LO # 1-4
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	Parts of speech. Pronouns.
Week 2	Subject, Lexical verbs, Auxiliry verbs, Regular Verb, Irregular Verb.
Week 3	Recognizing Objects and Complements.
Week 4	Adverbials.
Week 5	Tenses.
Week 6	Tenses.
Week 7	Active voice.
Week 8	Passive voice.
Week 9	Convert from active voice to passive voice and vice versa.
Week 10	Positive, comparative and superlative.
Week 11	Conditional sentences, if-clauses type I, II, III.
Week 12	Reading some of passages from IELTS books.
Week 13	English reading practice for beginners.
Week 14	Writing some of passages from IELTS books.
Week 15	English writing practice for beginners.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1	Lab 1: There are no laboratory experiments.
Week 2	Lab 1: There are no laboratory experiments.
Week 3	Lab 1: There are no laboratory experiments.

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	➤ Ronald Carter and Michael McCarthy. Cambridge grammar of English: A comprehensive guide. Cambridge: Cambridge University Press, 2006. ➤ Rodney Huddleston, Geoffrey K. Pullum. The Cambridge Grammar of the English Language, 2002.	Yes
Recommended Texts	➤ Collins Reading for IELTS by Els Van Geyte, 2011.	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 is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

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

Second Level

Module Information					
معلومات المادة الدراسية					
Module Title	Mathematics III		Module Delivery		
Module Type	Basic		☐ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	DWRE 211				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UG2	Semester of Delivery		1
Administering Department		Dams and Water Recourses	College	Engineering	
Module Leader	Muhanad Talal Yousif		e-mail	Mohanad_ALsheer@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. Omer	e-mail	o.agha@uomosul.edu.iq	
Scientific Committee Approval Date		1/9/2025	Version Number		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics II (DWRE 121)	Semester	Spring
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	6. To develop problem solving skills and understanding of Polar coordinates system and its applications. 7. To understand Vectors and Geometry of Space, Scalar Product, Cross Product 8. This course deals with the basic concept of Partial Differentiation. 9. To understand Double Integrals and its applications. 10. To perform Infinite Sequences and Series analysis.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	7. Discrimination between Polar coordinates system and cartesian coordinates system. 8. Learn how to calculate the area and curve length in Polar coordinates system. 9. Describe the vector components and the products between two vectors. 10. Identify Partial Differentiation and Second – Order Partial Differentiation. 11. Explanation the double integral. 12. Define the Infinite Sequences and Series.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Polar coordinates system, Graphing in polar coordinates system, Area in polar coordinates system, Curve length in polar coordinates system. [16 hrs] Vectors and Geometry of Space, Space coordinate and space vector, Scalar Product (Dot Product) and Applications (line equation in the plane), Cross Product (Vector Product) and Applications (the distance from a point to a line in space) . [24 hrs] Partial Differentiation, Second – Order Partial Differentiation, The chain rule for partial derivatives. [24 hrs] Double Integrals and its applications, The methods of least squares, Infinite Sequences and Series. [24 hrs]

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 exercises involving some problems that are interesting to the students in mathematics scope.

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

Total SWL (h/sem)		125			
الحمل الدراسي الكلي للطالب خلال الفصل					
Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (15)	2, 6, 12	LO #1, 2
	Assignments	5	10% (10)	1, 4, 7,11, 14	LO #1, 2
	Report	1	10% (10)	13	LO #1, 2
	seminars	1	5% (5)	10	LO #1, 2
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1,2
	Final Exam	3hr	50% (50)	16	LO # 1,2
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Polar coordinates system, Graphing in polar coordinates system
Week 2	Area in polar coordinates system, Curve length in polar coordinates system
Week 3	Vectors and Geometry of Space, Space coordinate and space vector
Week 4	Scalar Product (Dot Product) and Applications (line equation in the plane)
Week 5	Cross Product (Vector Product) and Applications (the distance from a point to a line in space)
Week 6	Plane Equation in space, Angles between planes
Week 7	Partial Differentiation, exercises
Week 8	Second – Order Partial Differentiation, exercises
Week 9	The chain rule for partial derivatives
Week 10	Directional Derivatives in the plane
Week 11	Tangent plane and normal line of surface
Week 12	Extreme (Maxima and Minima) values and Saddle points.
Week 13	Double Integrals and its applications
Week 14	The methods of least squares
Week 15	Infinite Sequences and Series
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	"Calculus". Ross L Finney and George B. Thomas. Copyright by Addison Wesley Publishing Company, 1990.	Yes
Recommended Texts	"THOMAS CALCULUS" George B. Thomas. Printed in the United States of America., 2014.	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	Fluid Mechanics 1		Module Delivery		
Module Type	Core		☒Theory ☒Lecture ☒Lab ☒Tutorial ☐Practical ☐Seminar		
Module Code	DWRE 212				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UG2	Semester of Delivery		1
Administering Department		Type Dept. Code	College	Type College Code	
Module Leader	Azza Nasralla Jaralla Al-talib		e-mail	a.altalib@uomosul.edu.iq	
Module Leader’s Acad. Title		Asst. Prof.	Module Leader’s Qualification		M.Sc.
Module Tutor	arwa abdalrazaq		e-mail	E-mail	
Peer Reviewer Name		ahmed younis	e-mail	E-mail	
Scientific Committee Approval Date		1/9/2025	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 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 fluid properties (units and dimensions, Density, Specific weight. Viscosity, Surface tension, Capillarity. Fluid static (pressure–density–height relationships).

	Absolute pressure and gage 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 lecturers.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. learn and practice to fluid properties. 2. learn the fundamental of pressure, (atmosphere, absolute and gauge) pressure. 3. Determine pressure in static fluid on vertical inclined and curved gates. 4. Determine stability of floating bodies and center of pressure.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction, Fluid properties – Units and Dimensions, Density, Specific weight, [15 hrs] Compressibility, Elasticity. Viscosity, Surface tension, Capillarity. [15 hrs] Fluid static (pressure–density–height relationships). [15 hrs] Absolute pressure and gage pressure,. types of pressure gages. [15 hrs] Force on submerged plane surfaces, Force on submerged curved surfaces, Applied problem about gates, damsetc. [15 hrs] Stability of submerged and floating bodies, [10 hrs]

	Application on Stability of submerged and floating bodies. [10 hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية				
	Time/Nu	Weight (Marks)	Week Due	Relevant Learning

		Number			Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction
Week 2	Fluid properties – Units and Dimensions, Density, Specific weight,
Week 3	Compressibility, Elasticity. Viscosity, Surface tension, Capillarity
Week 4	Fluid static (pressure–density–height relationships).
Week 5	Fluid static (pressure–density–height relationships).
Week 6	Absolute pressure and gage pressure,. types of pressure gages
Week 7	Mid-term Exam
Week 8	Force on submerged plane surfaces.
Week 9	Force on submerged curved surfaces
Week 10	Applied problem about gates, damsetc.
Week 11	Applied problem about gates, damsetc.
Week 12	Stability of submerged and floating bodies.

Week 13	Applied problems on Stability of submerged and floating bodies
Week 14	Applied problems on Stability of submerged and floating bodies
Week 15	Applied problems on Stability of submerged and floating bodies
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1:Center of Pressure of Immersed Surface
Week 2	Lab 2:Bernoulli's equation
Week 3	Lab 3:Forces due to Jet Impact on Plates
Week 4	Lab 4:Reynolds Number in Pipe
Week 5	Lab 5: Reynolds Number in Pipe
Week 6	Lab 6: Flow Through Orifices
Week 7	Lab 7: Flow Through Orifices

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Elementary fluid mechanics By: Vinnard 6 th ed. 1981	Yes
Recommended Texts	fluid mechanics by MERLE C. POTTER, DAVID C. WIGGERT 2008	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/fluid-mechanics	

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	Strength of Materials		Module Delivery
Module Type	B		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	DWRE 213		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	1
Administering Department	Dam and water resources	College	Engineering
Module Leader	Dr. Saddam M AHMED	e-mail	Ahmed.saddam@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Nil	e-mail	Nil
Peer Reviewer Name	Anmar A.M. Al-Talib	e-mail	Anmar.altalib@uomosul.edu.iq
Scientific Committee Approval Date	10/09/2024	Version Number	1.0

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

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

Module Aims أهداف المادة الدراسية	In DARE 213, initially students will learn six key fundamental learning outcomes planned within this course to enhance students understanding to the following aspects: i. Behavior of axially loaded bars and trusses. ii. Deformation and strain in cables and analysis indeterminate system. iii. Stresses under bending, shear, torsion and combination actions. iv. Internal shear and moment within the system. v. Deformation in beam systems. vi. Stresses in micro-elements.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion of this course the student shall be able to: 1. Assess the behavior of axially loaded bars and trusses, (i) 2. Design axially loaded bars and trusses, (i) 3. Assess the behavior of element under bending action, (iii) 4. Assess the shear stresses and design the connections and bolts, (ii) 5. Assess the shear stresses, deformation and design of system due to torsion, (ii) 6. Assess deformation and strain for cables and analysis indeterminate system, (iii) 7. Assess mechanical properties of beams and can evaluate the max shear and bending moment in the system, (iv) 8. Evaluate the stress distortion due to combination action of force and bending, (iii) 9. Assess the maximum deformation and slope with the system, (v) 10. Evaluate principal stresses and maximum in-plane shear stress using Mohr's circle—plane stress, absolute maximum shear stress, plane strain, (vi)

Indicative Contents المحتويات الإرشادية	An introduction to Strength of Materials, General Principles, Units of Measurement, Numerical Calculations [2hrs], Conditions for Rigid-Body Equilibrium [1hrs], Structural Analysis [2hrs]. Normal Stress in an Axially Loaded Bar, Internal Resultant Loadings [2hrs], Shear strength in supports, Design of pinned supports [3hrs]. Simple Truss stresses [2hrs], Allowable Stress in truss members, design of truss members [3hrs]. Design of Simple Connections [2hrs], Bolts connections, design of connection-plates [3hrs]. Deformation, Strain, Hooke's Law[2hrs], Strain Energy, Elastic Deformation of an Axially Loaded Member [3hrs]. Statically Indeterminate Analysis of system using additional Strain Relations [5hrs]. Torsion, Torsional Deformation of a Circular Shaft, Torsion Formula [2hrs], Power Transmission[1hrs], Angle of Twist, Statically Indeterminate Torque-Loaded Members [2hrs]. Bending, Shear and Moment Diagrams [5hrs]. Member Graphical Method for Constructing Shear and Moment Diagrams[5hrs]. Bending Deformation of a Straight Member [1hrs], Flexure Formula, Shear Formula [2hrs]. Deflection of Beams [2hrs]. State of Stress Caused by Combined Loadings (force and bending) [5hrs] The Elastic Curve [1hrs], Slope and Displacement by Integration [4hrs]. Slope and Displacement using Discontinuity Functions[3hrs], Method of Superposition [2hrs]. General Equations of Plane-Stress Transformation[2hrs], Principal Stresses and Maximum In-Plane Shear Stress[3hrs]. Mohr's Circle–Plane Stress[2hrs], Absolute Maximum Shear Stress[1hrs], Angular Stress Transmission[2hrs].
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	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. Students are encouraged to use the Internet to search for various topics, including contents of similar courses offered elsewhere. MS Excel software is used for preparing projects. Students can reach the teaching material, solved problems, data sheets, past exam papers etc. on the allocated Web site. The instructor will be happy to answer questions related to course content via email. Complex technical questions should be addressed in tutorial, during office hours, or by appointment. Emails must come from official University email addresses. The instructor will not respond to outside email addresses.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

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

Module Evaluation

تقييم المادة الدراسية

		Time /Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative	Quizzes	2	14% (14)	3, 9	LO #4 and #7

assessment	Assignments	8	16% (16)	2,4,6,8,10,11, 12,14	LO # (1-2), # (3-4), # 5- to - # 10
	Projects / Lab.	-	-	-	-
	Report	2	10% (10)	4,12	LO # 5 and #7
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO # 1-6
	Final Exam	3hr	50% (50)	16	LO # 1-10
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	An introduction to Strength of Materials, General Principles, Units of Measurement, Numerical Calculations, Conditions for Rigid-Body Equilibrium, Structural Analysis.
Week 2	Normal Stress in an Axially Loaded Bar, Internal Resultant Loadings, Shear strength in supports, Design of pinned supports.
Week 3	Simple Truss stresses, Allowable Stress in truss members, design of truss members.
Week 4	Design of Simple Connections, Bolts connections, design of connection-plates.
Week 5	Deformation, Strain, Hooke's Law, Strain Energy, Elastic Deformation of an Axially Loaded Member.
Week 6	Statically Indeterminate Analysis of system using additional Strain Relations.
Week 7	Torsion, Torsional Deformation of a Circular Shaft, Torsion Formula, Power Transmission, Angle of Twist, Statically Indeterminate Torque-Loaded Members.
Week 8	Bending, Shear and Moment Diagrams.
Week 9	Member Graphical Method for Constructing Shear and Moment Diagrams.
Week 10	Bending Deformation of a Straight Member, Flexure Formula, Shear Formula. Deflection of Beams.
Week 11	State of Stress Caused by Combined Loadings (force and bending)
Week 12	The Elastic Curve, Slope and Displacement by Integration.

Week 13	Slope and Displacement using Discontinuity Functions, Method of Superposition.
Week 14	General Equations of Plane-Stress Transformation, Principal Stresses and Maximum In-Plane Shear Stress.
Week 15	Mohr's Circle–Plane Stress, Absolute Maximum Shear Stress, Angular Stress Transmission.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	F. Singer & A. Pytel, D.I.T. "Strength of Materials". Harper & Row publisher, 2003. NewYork, USA.	Yes
Recommended Texts	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).	yes
Websites	Google Classroom	

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

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

Module Information				
معلومات المادة الدراسية				
Module Title	Surveying		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	DWRE 214			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UG2	Semester of Delivery	1	
Administering Department	DWRE 214	College	Engineering	
Module Leader	Dr. Omar Muqdad Abdulgany	e-mail	O.aga@uomosul.edu.iq	
Module Leader's Acad. Title	Asst.Prof.	Module Leader's Qualification	Ph.D.	
Module Tutor	Alaa A. Nasar	e-mail	E-mail	
Peer Reviewer Name		e-mail	E-mail	
Scientific Committee Approval Date	1/9/2025	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	Surveying I aims to teach students how to measure distances through obstacles,

أهداف المادة الدراسية	construction and adjustment of levels, Measurement a long straight line offset, Methods of locating a point or the types of coordinates, Systematic or accumulation errors for tape, Reciprocal leveling, Determine Contour Interval and Contour Line Values, determine the level of the sewer, and computation of area (regular and irregular figures) by using different methods.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After studying this course, the students should be able to: 1- To understand different types of survey. 2- To understand plane surveying instruments such as: tapes, levels. 3- To choose appropriate equipment for specific survey measurements. . 4- Interpret the disclosure and balancing in measurements. 5- To calculate areas using different methods 8- Contour mapping using different methods. 9- To determine the level of the sewer
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A: Surveying by tape</u> Surveying by tape: Measurement a long straight line, Measurement a long straight line offset, How to draw a perpendicular on survey line when the point is on the line, How to draw a perpendicular from point out of the straight line, By cross staff, Optical square . Methods of locating a point or the types of coordinates, Rectangular coordinates, Focal coordinates, Angular coordinate, Polar coordinates [15 hrs] Systematic or accumulation errors: Correction of tape for standardization, Correction for slope, Correction for temperature, Correction for sag, Correction for pull or tension . [6 hrs] Obstacles : Those which can be measured a cross but cannot be seen a cross, Those which can be seen a cross but cannot be measured a cross, Those can neither be seen a cross nor be measured a cross. [12 hrs] <u>Part B - Levelling</u>

	Levelling : Level, Horizontal surface, Horizontal line, Bench mark (B.M) , Simple levelling, Procedure in levelling, Rise and fall method, Height of collimation method [15 hrs] Cross-sections , contouring, Gridding or (The methods of squares), Radiating lines, Direct contouring [6 hrs] Reciprocal leveling, Curvature and Refraction, [6 hrs] Sewer [6hrs] Areas , Mechanical integration – the planimeter, Areas enclosed by straight lines , and Irregular figures [9hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

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

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered

Week 1	Introduction - Surveying by tape
Week 2	Methods of locating a point or the types of coordinates, Quiz No.1
Week 3	Systematic or accumulation errors
Week 4	Systematic or accumulation errors: Correction for sag, Correction for pull or tension
Week 5	Obstacles
Week 6	Levelling, Projection of building
Week 7	Mid-term Exam
Week 8	Procedure in levelling, Rise and fall method,
Week 9	Height of collimation method
Week 10	Cross-sections, Quiz No.2
Week 11	contouring, Gridding or (The methods of squares), Radiating lines, Direct contouring
Week 12	Reciprocal leveling,
Week 13	Curvature and Refraction, Sewer
Week 14	Sewer
Week 15	Areas , Mechanical integration – the planimeter, Areas enclosed by straight lines , and Irregular figures
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Create a straight line using tape
Week 2	Lab 2: Layout a building on graph paper
Week 3	Lab 3: cross section

Week 4	Lab 4: Level
Week 5	Lab 5: Profile levelling
Week 6	Lab 6: fly levelling
Week 7	Lab 7: cross section

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Surveying (A.Bannister & S.Raymond)	Yes
Recommended Texts	Surveying by (S.K.Hussin and M.SNagaraj)	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	Computer II		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	UOM 2032		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	UG2	Semester of Delivery	1
Administering Department	DWRE	College	COE
Module Leader	Omar Kannan Taha	e-mail	omar.alsultan@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer ass.	Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/9/2025	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The Module aim is to prepare student to deal with computers. In addition to, teach the student the fundamentals of computers and its components. Furthermore, learning how to use two of Microsoft Office applications (Word and Excel).

	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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	5. learn and practice to computer programming. 6. Solve problems in computer programming
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Security and Networking: What is a network? Types of networks. Basic network components [3 hrs] E-Commerce. [3 hrs] Computer Troubleshooting: Identifying and solving common hardware and software problems that computer users encounter, [6 hrs] Introduction to AI. [6 hrs] AI in Our Daily Lives.[3 hrs] AI in Our Daily Lives [3 hrs] Applications of AI [9 hrs] AI and Society [3 hrs] Ethical Challenges in AI [3 hrs] The Future of AI [3 hrs]

	Preparatory week before the final Exam [3 hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10

Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Network Security Basics. Understanding network threats. Network Troubleshooting
Week 2	Concepts of Electronic banking services this include online banking: ATM and debit card services, Phone banking, SMS banking, electronic alert, Mobile banking
Week 3	Basic troubleshooting techniques and tools for diagnosing and resolving issues.
Week 4	Basic troubleshooting techniques and tools for diagnosing and resolving issues.
Week 5	Definition of AI, History of AI, AI Techniques and Approaches, Challenges and Ethical Considerations
Week 6	Definition of AI, History of AI, AI Techniques and Approaches, Challenges and Ethical Considerations
Week 7	AI in smartphones and virtual assistants like Siri or Google Assistant.)
Week 8	AI in smartphones and virtual assistants like Siri or Google Assistant.)
Week 9	Education, Healthcare, Finance, Transportation, Marketing and Advertising.
Week 10	Education, Healthcare, Finance, Transportation, Marketing and Advertising
Week 11	Education, Healthcare, Finance, Transportation, Marketing and Advertising
Week 12	(How AI affects social, AI and international relations, AI and the future of humanity.)
Week 13	(AI ethics, privacy and surveillance, the impact of AI on the job market.)
Week 14	(Future trends in AI, recent research and emerging technologies.)
Week 15	Preparatory week before the final Exam
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: control statements practical examples and questions control statements – if statements-practical examples and questions
Week 2	Lab 2: logical statements – practical examples and questions
Week 3	Lab 3: matrix – introduction- practical examples and questions
Week 4	Lab 4: plotting using matlab plotting statements- practical examples and questions
Week 5	Lab 5: applied engineering numerical methods for solving equation- practical examples and questions
Week 6	Lab 6: applied engineering numerical methods for solving equation-Newton Raphson method-practical examples and questions
Week 7	Lab 7: applied engineering numerical methods for integration - trapezoidal methods- practical examples and questions

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Graham Brown, David Watson, "Cambridge IGCSE Information and Communication Technology", 3rd Edition (2020)	No
Recommended Texts	2. Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology in Action Complete", 16th Edition (2020). 3. Ahmed Banafa, "Introduction to Artificial Intelligence (AI)", 1st Edition (2024). 4 الخضر على الخضر بحث " أساسيات الحاسوب 2016 5 الدكتور عادل عبد النور, "مدخل إلى عالم الذكاء الاصطناعي " 2005	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	Building Construction		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	DWRE 217		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	UG2	Semester of Delivery	
Administering Department	Dams and Water Recourses	College	Engineering
Module Leader	Noor khattab	e-mail	n.kattab@uomosul.edu.iq
Module Leader's Acad. Title	Ass.Lecturer	Module Leader's Qualification	Msc
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/9/2025	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		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 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. 11. - Brick and block works. 12. - Stone works. 13. - Formworks and scaffolding. 14. - Lintels, beams and columns. 15. - Floors and ceilings. 16. - Moisture blocker works.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	In DWRE 217, initially students will learn Important and useful information about construction of buildings and methods of test construction materials. Upon successful completion of this course the student shall be able to understand: 13. The stages of construction of buildings. 14. Types of foundations. 15. Nature of soil and their relationship to foundations. 16. Types of stresses on hardened concrete.
Indicative Contents المحتويات الإرشادية	General introduction of buildings / stages of construction of buildings / steps of implementation / types of buildings / mechanical equipment used in earthworks / methods of groundwater discharge / Nature of soil and their relationship to foundations / Soil classification / Types of foundations / Piles foundation / Cement types / Cement components / aggregate grading / Standard specifications of aggregate / additives / Concrete properties before and after the hardening/Types of stresses on hardened concrete / dimensional and volume changes in concrete / work and production of concrete / methods of calculating weights of concrete mix materials/Concrete Placement and Grading / Maturation of concrete

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL)					
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا					
Structured SWL (h/sem)		63	Structured SWL (h/w)		4.2
الحمل الدراسي المنتظم للطلاب خلال الفصل			الحمل الدراسي المنتظم للطلاب أسبوعيا		
Unstructured SWL (h/sem)		37	Unstructured SWL (h/w)		2.5
الحمل الدراسي غير المنتظم للطلاب خلال الفصل			الحمل الدراسي غير المنتظم للطلاب أسبوعيا		
Total SWL (h/sem)		100			
الحمل الدراسي الكلي للطلاب خلال الفصل					
Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (15)	2, 6, 12	LO #1, 2
	Assignments	5	15% (15)	1, 4, 7,11, 14	LO #1, 2
	Report	4	10% (10)	13	LO #1, 2,3,4
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1,2
	Final Exam	2hr	50% (50)	16	LO # 1,2
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	General introduction of buildings, stages of construction of buildings, steps of implementation, types of buildings.
Week 2	Mechanical equipment used in earthworks, methods of groundwater discharge,

	Determinants of depth of foundations, Nature of soil and their relationship to foundations, Soil classification.
Week 3	Sieve analysis of concrete aggregate / sieve analysis of gravel.
Week 4	Types of foundations, vibrations and foundations, cases requiring the use of Piles foundations.
Week 5	Sieve analysis of sand.
Week 6	Piles foundations, Classification of piles, Piles groups, methods of calculating weights of concrete mixes materials.
Week 7	Specific gravity, Unit weight, moisture content of gravel.
Week 8	Concrete components, Cement types, Cement components, Gravel grading, Standard specifications of aggregates. Specific gravity, Unit weight, moisture content of sand.
Week 9	Additives, Concrete properties before and after the hardening. Find standard Softness and primary and final bonding time for cement paste.
Week 10	Types of stresses on hardened concrete.
Week 11	Find compressive strength of cement mortar for different ages.
Week 12	Dimensional and volume changes in concrete, work and production of concrete.
Week 13	Find tensile strength of cement mortar for different ages.
Week 14	Concrete Placement, Maturation of concrete, and Concrete Works in Hot weather, Classification of concrete by density.
Week 15	Properties of fresh concrete.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Construction of buildings, by Zuhair Saku and Artin Levon.	Yes

Recommended Texts	- 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.	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 اسم المنهج	اللغة العربية 2		Module Delivery
Module Type نوع المنهج	اساسي		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar
Module Code رمز المنهج	UOM2012		
ECTS Credits عدد الوحدات	2		
SWL (hr/sem) الحمل الكلي	50		
Module Level / المستوى	2	Semester of Delivery / سحب المنهج	
Administering Department القسم الإداري	هندسة السدود والموارد المائية	College الكلية	الهندسة
Module Leader اسم التدريسي	هدى رعد شريف	e-mail البريد الالكتروني	huda. shareef@uomosul. edu. iq
Module Leader's Acad. Title	-----	Module Leader's Qualification	-----
Module Tutor	-----	e-mail	-----
Peer Reviewer Name	-----	e-mail	E-mail-----
Scientific Committee Approval Date	1/9/2025	Version Number	2.0

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

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

	- الأخطاء اللغوية - الأملاء الجزء الخامس: (8 ساعات) - الادب في العصر العباسي - الشاعر المتنبي - الشاعر أبو تمام - الشاعر أبو فراس الحمداني				
Learning and Teaching Strategies					
استراتيجيات التعلم والتعليم					
Strategies الاستراتيجيات	إنَّ الغاية الأساسية من دروس اللغة العربية هو القضاء على الصعوبة والجمود الذي قد يصاحب مواضيع بعض هذه الدروس، بالإضافة إلى إيصال الأفكار والمعلومات المطلوبة إلى الطلاب بطرق مفهومة وتناسب الفروقات الفردية بينهم، ومن أبرز ما تم التركيز عليه في المحاضرات هو قواعد اللغة العربية والأدب وتتمثل الدراسة بالمحاضرات والامتحانات والواجبات داخل الصف والمناقشة والواجبات المنزلية.				
Student Workload (SWL)					
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا					
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	2.2		
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1.1		
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	50				
Module Evaluation					
تقييم المادة الدراسية					
	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome	
Formative Assessment التقويم التكويني	Quizzes الكويز	3	5% (15)	4,8 and 10	All
	H.W Assignments الواجبات البيتية	2	5% (10)	6, 7	CLO4, CLO5, and CLO6

	Seminars السمنار	1	5% (5)	12	All
	On-site Assignment واجبات داخل الصف	2	5% (10)	6, 10	CLO4, CLO5, and CLO6
Summative Assessment التقويم التلخيصي	Midterm Exam امتحان نصف الفصل	2 hrs	10% (10)	7	All
	Final Exam الامتحان النهائي	3 hrs	50% (50)	16	All
Total Assessment / التقويم النهائي			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered / المواضيع المغطاة
Week 1	قواعد اللغة العربية (النحو)
Week 2	المبتدأ والخبر
Week 3	نواسخ المبتدأ والخبر
Week 4	كان واخواتها
Week 5	إن واخواتها
Week 6	ظن واخواتها
Week 7	الامتحان الفصلي
Week 8	الأسماء المنصوبة
Week 9	المفعول المطلق
Week 10	الأخطاء اللغوية
Week 11	الأملاء
Week 12	الادب في العصر العباسي

Week 13	الشاعر المتنبي																
Week 14	الشاعر أبو تمام																
Week 15	الشاعر أبو فراس الحمداني																
Week 16	الامتحان النهائي																
Delivery Plan (Weekly Lab. Syllabus)																	
	Material Covered / المواضيع المغطاة																
Week 1	لا يوجد																
Week 2	لا يوجد																
Week 3	لا يوجد																
Week 4	لا يوجد																
Week 5	لا يوجد																
Week 6	لا يوجد																
Week 7	لا يوجد																
Learning and Teaching Resources																	
مصادر التعلم والتدريس																	
	<table><tr><th>Text</th><th>Available in the Library?</th></tr><tr><td>الاسم</td><td>هل متوفر في المكتبة؟</td></tr><tr><td>Required Texts</td><td>نعم</td></tr><tr><td>المنهج المطلوب</td><td></td></tr><tr><td>Recommended Texts</td><td>نعم</td></tr><tr><td>المنهج الموصى به</td><td></td></tr><tr><td>Websites</td><td></td></tr><tr><td>المواقع الالكترونية</td><td>https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/</td></tr></table>	Text	Available in the Library?	الاسم	هل متوفر في المكتبة؟	Required Texts	نعم	المنهج المطلوب		Recommended Texts	نعم	المنهج الموصى به		Websites		المواقع الالكترونية	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/
Text	Available in the Library?																
الاسم	هل متوفر في المكتبة؟																
Required Texts	نعم																
المنهج المطلوب																	
Recommended Texts	نعم																
المنهج الموصى به																	
Websites																	
المواقع الالكترونية	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/																
Grading Scheme																	
مخطط الدرجات																	
Group	Grade	التقدير	Marks %	Definition													

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

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

Module Information					
معلومات المادة الدراسية					
Module Title	Differential Equations		Module Delivery		
Module Type	B		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	DWRE 221				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UG2	Semester of Delivery		2
Administering Department		Dams and water resources Department	College	College of Engineering	
Module Leader	Ali Ahmed Abdulmawjood		e-mail	aliabdulmawjood@uomosul.edu.iq	
Module Leader’s Acad. Title		Assistant lecturer	Module Leader’s Qualification		Msc
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date		10/9/2025	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	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. To provide students with an understanding of simultaneous linear differential equations and their applications in engineering. To equip students with the ability to analyze physical and engineering problems by setting up and solving differential equations. To impart an understanding of Laplace transforms and how they can be used for the solution of differential equations. Overall, this course aims to provide a thorough understanding of differential equations and their use in various engineering and scientific applications. By the end of this module, students should be able to solve a variety of differential equations, both analytically and numerically, and apply this knowledge to real-world problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of this course students will be able to: 1. Define differential equations and classify them based on their degree, order, and formation. 2. Solve first-order differential equations using separation of variables. 3. Analyze and solve homogeneous, non-homogeneous, exact, and non-exact differential equations. 4. Classify differential equations as linear or non-linear and solve linear first-order differential equations. 5. Solve higher-order differential equations of varying degrees. 6. Solve second- and higher-order linear differential equations using the characteristic equation and general solutions. 7. Solve second- and higher-order linear differential equations with constant coefficients. 8. Solve second- and higher-order linear differential equations with variation of parameters. 9. Solve a system of linear differential equations using matrix methods. 10. Apply first-order differential equations to physical and engineering problems. 11. Utilize second-order differential equations to solve physical and engineering

	problems. 12. Apply second-order differential equations to model physical systems in various engineering applications. 13. Derive solutions for second-order differential equations in a specific engineering domain. 14. Use Laplace transforms to solve differential equations, including finding solutions from initial and boundary conditions.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Definition, Forming, Order and Degree of Differential Equation [4hr] 2. Solution of the first order D.E Separation of variables [4hr] 3. Homogeneous, non-homogeneous, Exact and not exact D.E [4hr] 4- Linear and nonlinear first order D.E 5. First order and higher degree D.E [4hr] 6. Solution of second and higher order linear D.E [4hr] 7. Solution of second and higher order linear D.E with constant coefficient 8. Solution of second and higher order linear D.E with variation of parameter [4hr] 9. Simultaneous linear D.E [4hr] 10. Physical and engineering application on first order D.E [8hr] 11. Physical and engineering application on second order D.E [8hr] 12. Laplace Transform Derivative of Newton forward and backward differences [8hr]

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.2
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	20% (20)	5, 11	LO #1:5 and 6:11
	Assignments	3	15% (15)	3, 7, 9	LO # 2 , 6 and 8
	Projects / Lab.	0	0% (0)		
	Report	1	5% (5)	13	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1:6
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
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Week 1	Defintion, Forming,Order and Degree of Differential Equation
Week 2	Solution of the first order D.E.Separation of variables
Week 3	Homogeneous, non-homogeneous Exact and not exact D.E
Week 4	Linear and nonlinear first order D.E
Week 5	First order and higher degree D.E
Week 6	Solution of second and higher order linear D.E
Week 7	Solution of second and higher order linear D.E with constant coefficient
Week 8	Solution of second and higher order linear D.E with variation of parameter
Week 9	Simultaneous linear D.E
Week 10	Physical and engineering application on first order D.E
Week 11	Physical and engineering application on first order D.E
Week 12	Physical and engineering application on second order D.E Physical and engineering application on second order D.E
Week 13	Physical and engineering application on second order D.E Physical and engineering application on second order D.E
Week 14	Laplace Transform
Week 15	Laplace Transform
Week 16	Preparatory week before the final Exam

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

Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Theory and Problems of Differential Equations	Yes
Recommended Texts	- By Frank Ayres, JR, PhD - Advanced Engineering Mathematics By Dass	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	Fluid Mechanics 2		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	DWRE 222			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	UG2	Semester of Delivery	2	
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Azza Nasralla Jaralla Al-talib		e-mail	a.altalib@uomosul.edu.iq
Module Leader's Acad. Title	Asst. Prof.	Module Leader's Qualification	M.Sc.	
Module Tutor	Name (if available)	e-mail	E-mail	
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	1/09/2025	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fluid mechanics 1, code:DWRE 212	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 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 velocity and acceleration of water flow. Conservation of mass: the continuity equation. One two three-dimensional flow, steady and unsteady flow. One

	dimensional flow Euler's equation, Bernoulli's equation determination and Application of Bernoulli's equation (venturi meter, orifice and sluice gate). Momentum equation determination and application.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. learn and practice to velocity measurements of water flow and calculated. 2. learn and practice to discharge measurements of water flow and calculated. 3. learn the conservation of mass: the continuity equation. 4. Determine discharge using Bernoulli's equation 5. Determine momentum by applying momentum equation. i 6. Apply of Bernoulli's and momentum equations on doing experiments in hydraulic laboratory.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction, [15 hrs] fluid kinematics [15 hrs] types of fluid flow [15 hrs] types of flow lines [15 hrs] conservation of mass continuity equation [15 hrs] Types of head or energy of a flow in motion [10 hrs] Bernoulli's equation

	[10 hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية				
	Time/Nu	Weight (Marks)	Week Due	Relevant Learning

		Number			Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction
Week 2	fluid kinematics
Week 3	types of fluid flow
Week 4	types of flow lines
Week 5	conservation of mass continuity equation
Week 6	continuity equation
Week 7	Mid-term Exam
Week 8	Types of head or energy of a flow in motion
Week 9	Bernoulli's equation
Week 10	Application of Bernoulli's equation
Week 11	Tutorials and problem solve
Week 12	Pumps in the Bernoulli Equation

Week 13	The impulse-momentum equation
Week 14	Applied problems on Bernoulli's equation
Week 15	Applied problems on Pumps in the Bernoulli Equation and momentum
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Discharge Measurements in Pipes by Orifice Meter
Week 2	Lab 2: Discharge Measurements in Pipes by Venturi Meter
Week 3	Lab 3: Friction Factor in Pipes
Week 4	Lab 4: Discharge Measurement in Open Channel by Weirs
Week 5	Lab 5: Discharge Measurement in Open Channel by Weirs
Week 6	Lab 6: Hydraulic Jump in open channel
Week 7	Lab 7: Hydraulic Jump in open channel

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Elementary fluid mechanics By: Vinnard 6 th ed. 1981	Yes
Recommended Texts	fluid mechanics by MERLE C. POTTER, DAVID C. WIGGERT 2008	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/fluid-mechanics	

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	Structures		Module Delivery		
Module Type	B		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	DWRE 223				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UG2	Semester of Delivery		2
Administering Department		Dam and water resources	College	Engineering	
Module Leader	Dr. Mohammed M. Khalaf		e-mail	mohammedmukhlifkhalaf@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			e-mail		
Scientific Committee Approval Date		1/09/2025	Version Number		1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Strength of Materials	Semester	Fall
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. Study the basic principles for structures. 2. Analyze the statically determinate structures. 3. Determine the elastic deformations of the statically determinate structures by using different methods. 4. Solve the indeterminate statically structures by using different methods.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Find out stability and determinacy of structures, 2. Analyze the statically determinate structures 3. Evaluate the elastic deformation of structures by virtual work (unit load) method 4. Evaluate the elastic deformation of structures by Castigliano`s first theorem method 5. Analyze the statically indeterminate structures by consistent deformation method 6. Analyze the statically indeterminate beams and frames by least work method 7. Analyze the statically indeterminate beams and frames by slope-deflection method 8. Analyze the statically indeterminate beams and frames by moment distribution method
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Determinate Structures</u> Stability and determinacy of structures, Analysis of the statically determinate structures. [4 hrs] The elastic deformation of beams by virtual work (unit load) method, The elastic deformation of frames by virtual work (unit load) method. [4 hrs] The elastic deformation of trusses by virtual work (unit load) method. [4 hrs] The elastic deformation of beams by Castigliano`s first theorem method, The elastic deformation of frames by Castigliano`s first theorem method. [4 hrs] The elastic deformation of trusses by Castigliano`s first theorem method. [4 hrs]   <u>Part B - Indeterminate Structures</u>   Analysis the statically indeterminate beams by method of consistent deformation, Analysis the statically indeterminate frames by method of consistent deformation [4 hrs]   The elastic deformation of trusses by Castigliano`s first theorem method. [4 hrs] Analysis the statically indeterminate beams by consistent deformation method [4 hrs] Analysis the statically indeterminate frames by consistent deformation method [4 hrs] Analysis the statically indeterminate beams by least work method [4 hrs] Analysis the statically indeterminate frames by least work method [4 hrs] Analysis the statically indeterminate beams by slope-deflection method [4 hrs]

	Analysis the statically indeterminate frames by slope-deflection method method [4 hrs] Analysis the statically indeterminate beams by moment distribution method [4 hrs] Analysis the statically indeterminate frames by moment distribution method [4 hrs]
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials involving some sampling activities that are interesting to the 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	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	5% (5)	11	LO #5 and 6
	Assignments	2	5% (5)	5, 14	LO # 3-8
Summative assessment	Midterm Exam	2	30% (30)	6, 15	LO # 1-4 and 5-8
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Stability and determinacy of structures, Analysis of the statically determinate structures
Week 2	The elastic deformation of beams by virtual work (unit load) method, The elastic deformation of frames by virtual work (unit load) method
Week 3	The elastic deformation of trusses by virtual work (unit load) method
Week 4	The elastic deformation of beams by Castigliano's first theorem method, The elastic deformation of frames by Castigliano's first theorem method
Week 5	The elastic deformation of trusses by Castigliano's first theorem method
Week 6	Exam I
Week 7	Analysis the statically indeterminate beams by method of consistent deformation, Analysis the statically indeterminate frames by method of consistent deformation
Week 8	Analysis the statically indeterminate trusses by method of consistent deformation
Week 9	Analysis the statically indeterminate beams by least work method
Week 10	Analysis the statically indeterminate frames by least work method

Week 11	Analysis the statically indeterminate beams by slope-deflection method
Week 12	Analysis the statically indeterminate frames by slope-deflection method
Week 13	Analysis the statically indeterminate beams by moment distribution method
Week 14	Analysis the statically indeterminate frames by moment distribution method
Week 15	Exam II
Week 16	Preparatory week before the final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Elementary Theory of Structures, YUAN-YU HSIEH, PRETICE-	Yes

	HALL, 1980.	
Recommended Texts	Hibbeler R. C. (2012). Structural analysis (8th ed.). Pearson/Prentice Hall.	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 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	Areas and Volumes		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	DWRE 224		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UG2	Semester of Delivery	2
Administering Department	DWRE 224	College	Engineering
Module Leader	Dr. Omar Muqdad Abdulgany	e-mail	O.agma@uomosul.edu.iq
Module Leader's Acad. Title	Asst.Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Alaa A. Nasar	e-mail	E-mail
Peer Reviewer Name		e-mail	E-mail
Scientific Committee Approval Date	20/08/2023	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	Surveying II aims to teach students how to calculate the earthworks and reservoir volumes from contour maps, bearing of lines, designation of bearing, theodolite, construction and adjustment of the theodolite, measurement of angles, traverse surveys and their adjustment, tachometer, and total station.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of this course students will be able to: 1- To understand different types of survey (i). 2-To calculate areas using different methods(i) 3-To calculate volumes using different methods(i) 4- To determine and choose the appropriate method for calculating earthwork volumes (iii) 5- To use plane surveying instruments such as: Theodolite, Tachometry and Total station (iii) 6- To choose appropriate equipment for specific survey measurements (iii).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A: Area and Volumes</u> Introduction, Irregular figures, Give and take lines, Counting squares, Trapezoidal Rule, Simpson Rule (for odd number) [12 hrs] Volumes Earthwork calculation, Volumes from cross-sections, Sections level a cross (one level section), Sections with a cross fall (two level section),Sections part in cut and part in fill, Section of variable levels (three level section), Multi-level section Computation of volumes, mean areas, end areas, Prismoidal formula, The volume of a pyramid, The Volume of wedge, [15 hrs] Simpson's Rule for Volumes, Volumes from spot levels or (volume of Borrow), Volume from contour lines [9 hrs] <u>Part B – Theodolite and Tachometry, and Totalstation</u> Bearing, Designation of Bearings, whole circle system, Quadrantal system, Deflection angle, Fore and Back Bearings , Calculation of bearings from angles, Calculation of deflection angles from included angles. [18 hrs] The theodolite and traverse surveying, Traverse computations, Latitudes and departure, Closing error, Graphical adjustment, bowditch's rule, Transit rule, Distribution of the angular error [15 hrs]

	Tachometry, Optical principles, Determine the stadia interval factor [15 hrs] Total station [6hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

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

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction, Irregular figures, Give and take lines, Counting squares.
Week 2	Counting squares, Trapezoidal Rule, Simpson Rule (for odd number), Quiz No.1
Week 3	Volumes Earthwork calculation, Volumes from cross-sections, Sections level a cross (one level section), Sections with a cross fall (two level section).
Week 4	Sections part in cut and part in fill, Section of variable levels (three level section), Multi-level section
Week 5	Computation of volumes, mean areas, end areas, Prismoidal formula.
Week 6	The volume of a pyramid, The Volume of wedge.
Week 7	Simpson's Rule for Volumes, Volumes from spot levels or (volume of Borrow), Volume from contour lines
Week 8	Mid-term Exam, Bearing, Designation of Bearings,

Week 9	Deflection angle, Fore and Back Bearings. Calculation of bearings from angles,
Week 10	Calculation of deflection angles from included angles, Quiz No.2
Week 11	The theodolite and traverse surveying, Traverse computations, Latitudes and departure.
Week 12	Closing error, Graphical adjustment, bowditch's rule, Transit rule, Distribution of the angular error
Week 13	Tachometry, Optical principles, Determine the stadia interval factor
Week 14	Tachometry, Optical principles , Total station
Week 15	Total station
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Planimeter
Week 2	Lab 2: Contour mapping using the surfer software
Week 3	Lab 3: Theodolite
Week 4	Lab 4: Layout a building on graph paper using Theodolite.
Week 5	Lab 5: Traverse surveying
Week 6	Lab 6: Measure distances using Tachometry.
Week 7	Lab 7: Total station

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
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Required Texts	Surveying (A.Bannister & S.Raymond)	Yes
Recommended Texts	Surveying by (S.K.Hussin and M.SNagaraj)	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 (فقد 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	Physics and Soil Science		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	DWRE 225			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	UG2	Semester of Delivery		
Administering Department		Dam and water resources engineering	College	Engineering
Module Leader	Mohammad Tarik Mahmood		e-mail	m.altaiee@uomosul.edu.iq
Module Leader's Acad. Title		Instructor	Module Leader's Qualification	Ms.c
Module Tutor	Dr. Abdulazeez Abdulbasit Mohamed Abdulghani khalaf mohammed		e-mail	abdulazeez.mohammed@uomosul.edu.iq alrobaai1982@uomosul.edu.iq
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date		1/09/2025	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	10. Soil structure: arrangement and organization of soil particles 11. Soil porosity, permeability, and water movement 12. Understanding soil structure is important for optimizing soil management practices such as irrigation, drainage, and soil compaction.

	13. To Understand as follows: movement, distribution water in the soil. 14. Understanding soil water dynamics such as infiltration, evaporation, water storage, and capillary rise. 15. Crucial for efficient water management
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	16. Understanding soil physical properties soil texture, structure, density, porosity, and water retention characteristics. 17. To Knowledge movement and distribution of water in soils. 18. Identify Soil water potential & how it affects plant growth. 19. Giving students basic idea about Soil-plant-water relationships 20. Enable the student to analyze laboratory data 21. Knowledge the student about soil temperature dynamics. 22. Learn students about the soils compaction characteristics. 23. Understand how soil compaction affects soil properties. 24. Develop the skills of student about thinking, analysis by soil space 25. Students should gain practical experience in conducting soil physics experiments, field measurements, and data collection.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part – A Fundamental of Soil Physics Introduction, Physical soil properties – Mass and volume relations, Soil water flow condition [12 hrs] Soil water potential, Soil water Characteristic curve – Water flow in saturated soil, Darcy equation [12 hrs] Hydraulic conductivity and permeability – Water flow in unsaturated soil [12 hrs] The general flow equation –The general flow equation (Richard's equation) [12 hrs] Part- B Water management Introduction to water management, infiltration – internal drainage and moisture redistribution after infiltration, evaporation in the presence of ground [12 hrs] evaporation with water levels and the risk of salinization, water balance of the root zone – salinization and land classification affected by salts, Salt balance equation [12 hrs]

	leaching requirements – reclamation leaching [12 hrs] Reclamation of gypsum and limestone soils [6 hrs]
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Learning and Teaching Strategies			
استراتيجيات التعلم والتعليم			
Strategies	Learning and teaching strategies play a crucial role in facilitating effective education in soil physics. Here are some common strategies that can be employed for both learning and teaching in this field: Lectures: Lectures provide an opportunity for instructors to present key concepts, theories, and principles of soil physics to students. They can use visual aids, demonstrations, and real-life examples to enhance understanding. Students can take notes, ask questions, and engage in discussions during or after the lecture. Laboratory Work: Practical laboratory sessions allow students to gain hands-on experience in conducting soil physics experiments and measurements. They can learn techniques for soil sampling, analysis of soil physical properties.		
Student Workload (SWL)			
الحمل الدراسي للطالب			
Structured SWL (h/sem)	93	Structured SWL (h/w)	6.2
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem)	57	Unstructured SWL (h/w)	3.8
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem)	150		
الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	4, 9	LO #1, 2, 3, 4 and 10
	Assignments	1	10% (10)	8	LO # 1-8
	Projects / Lab.	1	10% (10)	12	LO # 1-12
	Report	1	10% (10)	13	LO # 1-13
Summative assessment	Midterm Exam	1	10% (10)	14	LO # 1-13
	Final Exam	2hr	50% (50)	16	All

Total assessment	100% (100 Marks)		
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Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction, Physical soil properties.
Week 2	Mass and volume relations, Soil water flow condition.
Week 3	Soil water potential.
Week 4	Soil water Characteristic curve.
Week 5	Water flow in saturated soil, Darcy equation.
Week 6	Hydraulic conductivity and permeability.
Week 7	Water flow in unsaturated soil.
Week 8	The general flow equation (Richard's equation).
Week 9	Introduction to water management, infiltration.
Week 10	internal drainage & moisture redistribution after infiltration, evaporation in the presence of ground.
Week 11	evaporation with water levels and the risk of salinization, water balance of the root zone.
Week 12	salinization and land classification affected by salts, Salt balance equation.
Week 13	leaching requirements.
Week 14	reclamation leaching.
Week 15	Reclamation of gypsum and limestone soils.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Description of the field, soil profile, soil samples Collection and Examination of soil textured.
Week 2	Estimation of moisture content.
Week 3	Tensiometer and estimation of capillary tension.
Week 4	Determination of soil field capacity and wilting point.
Week 5	Determination of hygroscopic and capillary water of soil.
Week 6	Estimating the saturation percentage in the soil and preparing the soil extract.

Week 7	Estimation of Soil pH reaction and dissolved salts in soil EC.
Week 8	Volumetric analysis of different soil particles by hydrometer.
Week 9	Volumetric analysis of different soil particles by Sieving.
Week 10	Determination of Bulk density.
Week 11	Determination of soil particle density and pore space.
Week 12	Estimation of Hydraulic conductivity by constant head.
Week 13	Estimation of Hydraulic conductivity by falling head.
Week 14	Infiltration experiment.
Week 15	Estimation of soil color.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	فيزياء التربة التطبيقية ترجمة وإعداد الدكتور سمير خليل الخفاف – مجلس البحث العلمي. بغداد – العراق Established Land reclamation and cultivation Prof. Dr. Al-Metwally Mustafa Saleem	Yes
Recommended Texts	فيزياء التربة – تأليف الدكتور هشام محمود حسن جامعة الموصل / كلية الزراعة والغابات Field guide for hill land reclamation and water management Mohamed Sabir,	Yes
Websites	Soil Physics by Dr. David L. Lindbo (University of Kentucky): This website offers lecture notes, course materials, and resources on various aspects of soil physics. It covers topics such as soil water, soil temperature, soil mechanics, and soil-plant relationships. Website: https://www.uky.edu/Ag/Soils/soils-pss443	

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	English 2		Module Delivery
Module Type	Support		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOM 2022		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UG2	Semester of Delivery	2
Administering Department	DWRE	College	COE
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/09/2025	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 and Learning Outcomes	Students will be able to: 16. Distinguish between dependent, Independent, and Integrated essays. 17. Find the topic and the thesis statement of short essays. 18. Identify the main ideas from the introduction paragraph. 19. Identify the main ideas from the body paragraph. 20. Find the supporting details from the introduction paragraph. 21. Find the supporting details from the body paragraph. 22. Draw an outline to link the ideas, supporting details, and essay topic.

	23. Make notes in response to an essay question to create main ideas, supporting details, and thesis statement. 24. Write the introduction paragraph on basis of the thesis statement and main ideas. 25. Build the body paragraphs based on main ideas and supporting details. 26. Write the introduction paragraph based on the main ideas. 27. Enhance the smoothness and fluency of an essay by employing transition words and sentence starters.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Classification of Essays: [2 hrs] - Independent essays based on personal thoughts. - Dependent essays based on data, figures, diagrams. - Integrated essays Structure of academic essays: [6 hrs] - Analyzing academic essays according to the standard structure of academic essays. Idea Maps: [3 hrs] - Filling the idea maps from the major information extracted while reading an essay. Responding to an essay question: [4 hrs] - Building an outline using personal ideas in response to an essay question. Writing Paragraphs: [6 hrs] - Writing thesis statement. - The Introduction Paragraph. - The Body Paragraphs. Essay Conclusion: [3 hrs] - Writing the conclusion paragraph considering the main ideas stated in the introduction and body paragraphs Transition words and connection phrases: [3 hrs] Dependent essays: [3hrs] - Introduction to essays based on figures, tables, diagrams, and processes

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The approach to be followed here is to motivate students to analyze previously written model essays to understand the standard structure of academic essays then implement the same procedures to build their own essays.

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 أسبوعياً	2.2
Unstructured SWL (h/sem)	17	Unstructured SWL (h/w)	1.13

الحمل الدراسي غير المنتظم للطلاب خلال الفصل			الحمل الدراسي غير المنتظم للطلاب أسبوعيا		
Total SWL (h/sem)		50			
الحمل الدراسي الكلي للطلاب خلال الفصل					
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, 3, 8 and 10
	Assignments	2	10% (10)	3, 12	LO # 5, 6,11 and 12
	Projects / Lab.				
	Report	1	20% (20)	14	LO # 1-10
Summative assessment	Midterm Exam				
	Final Exam	3hr	60% (60)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Overview of Academic Essays Independent, Dependent, and Integrated essays Structure of academic essays
Week 2	Structure of academic essays
Week 3	Topic sentence and thesis statement Identifying topic sentence and thesis statement of academic essays.
Week 4	Main Ideas: Identifying the main Ideas of academic essays.
Week 5	Supporting Details: Identifying the supporting details
Week 6	Essay outlines: Building Essay outlines using idea maps
Week 7	Essay Questions: Responding to essay questions by making personal notes
Week 8	Topic Sentence : Writing a thesis statement or topic sentence using personal thoughts.
Week 9	Personal Thoughts: Using personal thoughts to express main ideas and supporting details in response to an essay question.
Week 10	Idea Map Creation: Building an idea map of an essay question.
Week 11	Transition words and sentence starters Increasing the fluency, coherence, and smooth transition of thoughts using sentence starters and transition words.
Week 12	Writing the Introduction: Combining the thesis statement and main ideas together to build the introduction paragraph.
Week 13	Writing the Conclusion
Week 14	Introduction to dependent writing tasks
Week 15	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: There are no laboratory experiments.
Week 2	Lab 2: There are no laboratory experiments.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	➤ No Textbook is required for this course. Supplemental materials will be provided by provided by the instructor.	
Recommended Texts	➤ Sharpe, P. J. (2009). <i>Barron's TOEFL iBT. Barron's Educational Series.</i> ➤ Louaheed, L. (2016). <i>Barron's ielts with Mp3 Cd. Barron's.</i>	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 is required, but credit is given.
	F – Fail	راسب	(0-44)	A significant amount of work is required.

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

Module Information

معلومات المادة الدراسية

Module Title	جرائم حزب البعث في العراق	Module Delivery
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اسم المنهج				
Module Type نوع المنهج	اساسي		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code رمز المنهج	UOM201			
ECTS Credits عدد الوحدات	2			
SWL (hr/sem) الحمل الكلي	50			
Module Level / المستوى		UGII		
Administering Department القسم الإداري	ENV8	College الكلية	ENG4	
Module Leader اسم التدريسي	نهال عبد الوهاب حامد		e-mail البريد الالكتروني	nehal.hamid@uomosul.edu.iq
Module Leader's Acad. Title	مدرس مساعد Assistant Lecture	Module Leader's Qualification	ماجستير MS. C.	
Module Tutor	نهال عبد الوهاب حامد		e-mail	nehal.hamid@uomosul.edu.iq
Peer Reviewer Name	نهال عبد الوهاب حامد		e-mail	nehal.hamid@uomosul.edu.iq
Scientific Committee Approval Date		Version Number		
Relation with other Modules العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	لا يوجد		Semester	
Co-requisites module	لا يوجد		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1- التعرف على الجرائم التي ارتكبتها النظام البعثي في العراق 2- الالمام بمعرفة الجرائم وأنواعها 3- التوعية والتعريف بخطورة الجرائم 4- تعزيز قدرة الطالب على تحليل سياسة النظام الحاكم
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	توثيق الانتهاكات والجرائم التي ارتكبتها نظام البعث: COL-1 توضيح المعاناة التي مر بها الضحايا: COL-2 تعزيز القيم الانسانية مثل الديمقراطية وحقوق الانسان وسيادة القانون: COL-3 تعزيز ثقافة المساءلة عن الجرائم والانتهاكات مما يعزز من دور القانون في المجتمع: COL-4
Indicative Contents المحتويات الإرشادية	الفصل الاول جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005م 1- مفهوم الجرائم واقسامها 2- تعريف الجريمة لغة واصطلاحا 3- اقسام الجرائم 4- انواع الجرائم الدولية 5- القرارات الصادرة من المحكمة الجنائية العليا الفصل الثاني الجرائم النفسية والاجتماعية وآثارها وابلرز انتهاكات النظام البعثي في العراق الجرائم النفسية آليات الجرائم النفسية آثار الجرائم النفسية الجرائم الاجتماعية عسكرة المجتمع موقف النظام البعثي من الدين انتهاكات القوانين العراقية صور انتهاكات حقوق الانسان وجرائم السلطة بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث أماكن السجون والاحتجاز لنظام البعث الفصل الثالث

	الجرائم البيئية لنظام البعث في العراق 1- التلوث الحربي والاشعاعي وانفجار الالغام 2- تدمير المدن والقرى (سياسة الارض المحروقة) 3- تجفيف الاهوار 4- تجريف بساتين النخيل والاشجار والمزروعات الفصل الرابع 1- جرائم المقابر الجماعية 2- أحداث مقابر الابادة الجماعية المرتكبة من النظام البعثي في العراق 3- التصنيف الزمني لمقابر الابادة الجماعية في العراق للمدة 1963-2003م			
Learning and Teaching Strategies استراتيجيات التعلم والتعليم				
Strategies الاستراتيجيات	توسيع مدارك الطالب لمفهوم الجريمة واسلوبها وطرق استخلاص الدروس والعبر من الجرائم والانتهاكات التي ارتكبت خلال فترة حكم حزب البعث			
Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا				
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	2.2	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1.1	
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	50			
Module Evaluation تقييم المادة الدراسية				
	Time/Number	Weight% (Marks)	Week Due	Relevant Learning Outcome

Formative Assessment التقويم التكويني	Quizzes الكويز	2	4% (8)	3,6	COL-1, COL-2
	Online Assignments	4	2% (8)	3,5,6	CLO-1, CLO-2, CLO-3, CLO-4
	Seminars السمنار	0	0	0	0
	Report التقارير	1	10% (10)	4	CLO-1, CLO-2, CLO-3, CLO-4
	Onsite Assignment واجبات داخل الصف	1	6% (6)	5	COL-2 ,COL-3
Summative Assessment التقويم التلخيصي	Midterm Exam امتحان نصف الفصل	2 hrs	10% (10)	9	CLO-1 to CLO-7
	Final Exam الامتحان النهائي	3 hrs	50% (50)	16	All
Total Assessment / التقويم النهائي			100% (100 Marks)		(100 Marks)
Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري					
	Material Covered / المواضيع المغطاة				
Week 1	مفهوم الجرائم واقسامها				
Week 2	انواع الجرائم الدولية				
Week 3	الجريمة السياسية				
Week 4	الجريمة الاجتماعية				
Week 5	جريمة قمع الانتفاضة الشعبانية				
Week 6	الجرائم النفسية وآثارها				
Week 7	جريمة قمع الانتفاضة الشعبانية				

Week 8	الجرائم النفسية وآثارها	
Week 9	جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا 2005	
Week 10	جرائم احداث الجمعة	
Week 11	جرائم المقابر الجماعية وقصف العتبات المقدسة	
Week 12	الهجوم الكيميائي على حلبجة	
Week 13	استخدام الاسلحة المحرمة دوليا	
Week 14	الجرائم البيئية لنظام البعث في العراق	
Week 15	أحداث المقابر والابادة الجماعية المرتكبة في النظام البعثي في العراق	
Week 16	Preparatory week before the final Exam	
Delivery Plan (Weekly Lab. Syllabus)		
	المواضيع المغطاة / Material Covered	
Week 1		
Week 2		
Week 3		
Week 4		
Week 5		
Week 6		
Week 7		
Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text الاسم	Available in the Library? هل متوفر في المكتبة؟
Required Texts المنهج المطلوب	جرائم نظام البعث في العراق	
Recommended Texts	من قبل وزارة التعليم	

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

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

Third Level

Module Information				
معلومات المادة الدراسية				
Module Title	Hydraulic		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	DWRE 311			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UG3	Semester of Delivery		1
Administering Department	DWR	College	ENG	
Module Leader	Dr. Mena Ahmed Alsawaf		e-mail	m.alsawaf@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 Altalib		e-mail	anmar.altalib@uomosul.edu.iq
Scientific Committee Approval Date	1/9/2025	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	On successful completion of this course students will be able to: 1. Recognize the common types of flow in pipes 2. Apply the basic concepts of sciences and engineering to solve issues associated with the flow in pipes

	3. Formulate the main parameter to design a model related to flow of water 4. Develop and solve design problems and analyze the data to evaluate the pipes used in supply system 5. Identify and analyze the solution of a problem occurs in flow over a hydraulic structure
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how to create a model (physical or numerical) and select the relevant variables. 2. Understand the flow in pipes and their types and what are their application. 3. Summarize what is meant by a shear stress in pipes, friction force. 4. Discuss the usage of non-circular pipes and how to deal with them theoretically. 5. Describe the different types of fitting added to the system of water supply. 6. Define the connection between pipes and how to deal with them hydraulically, in term of parallel, series and branched. 7. Identify the basic of designing the network of water supply system. 8. Discuss the requirements and limitation of water supply system. 9. Discuss the various properties and types of pumps. 10. Explain the connection of pumps to a system. 11. Identify the main characteristic of pumps and their curves.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Dimensionless Analysis and Similarity</u> Defining the main variables of each problem and learn how to group them in order to solve the case in easiest way, identify the main forces affected on fluid flow and use their terms in solve relevant cases. Learn the applications of Reynolds No., Froude No. Webber No., Euler No. and Mach No., then, apply them in many applications. Dynamic similarity and geometric similarity. [10 hrs] <u>Part B – Flow in a section of a Pipe</u> Flow in pipes and the fundamental equations, major losses in pipes, classify the flow types, identify the main formulas for each case of flow types. distributions of velocity and shear in section of a pipe. Laminar flow: applications and relevant formulas. Turbulent flow: applications and relevant formulas in both cases of hydraulically smooth or rough. Using Moody diagram to indicate the roughness, the flow in non-circular pipes. [35 hrs] <u>Part C – Flow in Pipes</u> Hydraulic grad line, the losses due to fitting in a system of pipes, valves, bending, expansions, contractions and meters. Connection between pipes and tanks, the affected discharge and energy, pipes in parallel, pipes in series, equivalent pipes, branched channel, and computing the distributed discharge in a network. [25 hrs] <u>Part D – Pumps</u> Adding a pump in a system, its energy and power, the type of pumps, how pumps

	connect parallel and series, learning how to use their characteristics curves. [10 hrs]
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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, class works and by considering type of simple experiments involving some sampling activities that are interesting to the students.		
Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5
الحمل الدراسي المنتظم للطلاب خلال الفصل		الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (h/sem)	47	Unstructured SWL (h/w)	3
الحمل الدراسي غير المنتظم للطلاب خلال الفصل		الحمل الدراسي غير المنتظم للطلاب أسبوعيا	
Total SWL (h/sem)	125		
الحمل الدراسي الكلي للطلاب خلال الفصل			

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (10)	4, 8, 12	LO #1, 2, 10 and 11
	Assignments	5	15% (15)	2,4,6,8,10	LO # 3, 4, 6 and 7
	Projects / Lab.	0	-	-	-
	Report	-	-	-	-

	Monthly exam	2	20% (20)	6,13	all
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Dimensionless analysis
Week 2	Modelling in pipes and open channel
Week 3	Flow in pipes, general equations
Week 4	Laminar and turbulent flow in pipes
Week 5	Distribution of velocities and shear stress in pipes
Week 6	Flow in smooth pipes, seventh root law
Week 7	Flow in rough pipes
Week 8	Classification of rough and smooth flow in pipes
Week 9	Flow in non-circular pipes
Week 10	Minor losses of the fittings, flow in orifice and syphon
Week 11	Connect pipes in parallel and series
Week 12	Branched channel, connection with tanks
Week 13	Hardy- cross method to measure discharge in each pipe of a networks
Week 14	Pumps: introduction, connections and efficiency
Week 15	Pumps in parallel and series
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	Rajput, R.K., 2004. <i>A textbook of fluid mechanics and hydraulic machines</i> . S. Chand Publishing.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering	

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 (فقد 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	Surface water Hydrology		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	DWRE 312			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UG3	Semester of Delivery		1
Administering Department	Dams and Water Resources	College	Engineering	
Module Leader	Dr.Rasha M. Sami Fadhil		e-mail	Rasha.fadhil@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PhD	
Module Tutor			e-mail	
Peer Reviewer Name	Anmar A.M. Al-Talib	e-mail	Anmar.altalib@uomosul.edu.iq	
Scientific Committee Approval Date	1/9/2025	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	Surface Water hydrology is essential for third-stage dams and water resources engineering students in order to • Provides an introduction to hydrological processes; measurements and modelling. It focuses on practical applications of hydrology • Quantify the hydrologic processes and integrate them into hydrologic design procedures. • know and understand the basic principles and equations used for surface water hydrology, and the main characteristics of the different types of hydrologic simulators.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Overview of essential concepts encountered in hydrological systems. • Developing a sound understanding of concepts as well as a strong foundation for their application to real-world, in-the-field problem solving. • Acquisition of knowledge by learning new concepts, and properties and characteristics of water and surface water in specific • Cognitive skills through thinking, problem solving and use of experimental work and inferences • Numerical skills through application of knowledge in basic mathematics and supply issues. • Student becomes responsible for their own learning through solution of assignments, laboratory exercises and report writing • Solving problems in hydrology and making decisions about hydrologic issues that involve uncertainty in data /incomplete data, and the variability of natural materials.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Fundamentals of Surface Water Hydrology .(6hrs) • Meteorological data (Humidity, temperature, radiation and wind)(6hrs) • Precipitation.(6hrs) • Evaporation and transpiration.(6hrs) • Infiltration and percolation.(7hrs) • Hydrograph .(8hrs)

	• Rainfall-Runoff process (Surface water runoff). (8hrs) • Design Flood estimations.(8hrs) • Flood routing .(8hrs) • Modelling Watershed Hydrology. (8hrs)
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The essential strategy of this module is to motivate students to • use real-world data to develop a water budget for unfamiliar basins. • Identify interconnections in hydrological systems and predict changes. • Predictions of hydrological terms influencing the hydrological cycle. • Collection of data, analysis and interpretation.

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	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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	First monthly Exam	2 hr	15% (15)	8	#1, 2, 3 and 4

	Second monthly Exam	2hr	15% (15)	15	# 5, 6 and 7
Summative assessment	Class work	2 hr	10% (10)	5,7,9,10,12, 13	All
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Hydrological definition, The hydrological cycle, Global Water Balance The water balance equation or the hydrological equation Google earth software
Week 2	Engineering applications of hydrology, Typical failure factors for hydraulic installations Google earth software
Week 3	Climate elements: Introduction, Temperatures, solar radiation Evaporation, moisture, Atmospheric pressure, and wind. Google earth software
Week 4	Precipitation: Forms of precipitation, Precipitation measurement, Precipitation measuring grid, Initialize the information, Check the smoothness of records, Precipitation measurement methods, The hectograph Global mapper software
Week 5	Precipitation losses: The loss from the rainfall, Evaporation process, Evaporation gauges, Evaporation stations Global mapper software
Week 6	Empirical evapotranspiration equations, Analytical methods for estimating evapotranspiration. Global mapper software

Week 7	Runoff: Factors affecting the value or volume of surface runoff, Division of surface runoff WMS software
Week 8	First Monthly Exam
Week 9	Hydrograph, The flow characteristics of the streams Empirical equations, Flow Curve Characteristics – Sustainability, Cumulative (mass) flow curve. WMS software
Week 10	Calculation of storage volume, Calculations of an accepted order WMS software
Week 11	Hydrograph: Introduction, Factors affecting flood hydrograph, Hydrograph Components, Separation of the hydrograph, effecting rainfall WMS software
Week 12	Standard hydrograph, Derivation of the standard hydrograph Standard hydrographs of different durations, The uses, and limitations of the standard hydrograph. WMS software
Week 13	Flood routing Microsoft Excel
Week 14	Reservoir routing- channel routing Microsoft Excel
Week 15	Second monthly exam.
Week 16	The preparatory week before the Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the
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		Library?
Required Texts	Ward, Roy C., and Mark Robinson. <i>Principles of hydrology</i> . Vol. 367. London: McGraw-Hill, 1975.	Yes
Recommended Texts	Raghunath, H. M. (2006). <i>Hydrology: principles, analysis and design</i>. New Age International. Hiscock, K. M., & Bense, V. F. (2014). <i>Hydrogeology: principles and practice</i>. John Wiley & Sons.	Yes
Websites	https://www.youtube.com/watch?v=bOkzVV9VLRI https://www.ldeo.columbia.edu/~martins/hydro/syl_p.html	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
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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	Irrigation principles and practices		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar		
Module Code	313				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UG3	Semester of Delivery		1
Administering Department		Dam and water resources	College	Engineering	
Module Leader	Dr.Anmar Abdulaziz Majeed		e-mail	Anmar.altalib@uomosul.edu.iq	
Module Leader’s Acad. Title		Assistant Professor	Module Leader’s Qualification		Ph.D.
Module Tutor	Ass.Lec.Alaa Ismaeel Naser		e-mail	E-mail	
Peer Reviewer Name		Anmar A.M. Al-Talib	e-mail	Anmar.altalib@uomosul.edu.iq	
Scientific Committee Approval Date		1/9/2025	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.To understand Irrigation – world wide 2. To understand Sources and storage of Irrigation water

	3. To understand the Basic soil-water relations 4.To understand the Flow of water onto and through soils. 5. To understand the Measurement of soil moisture. 6. To understand the Irrigation water conveyance .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how to efficient use of water. 2. Securing the plant against short-term droughts. 3. Giving students a simple idea about irrigation methods. 4. Learn about the most important sources of irrigation water and methods of storing it. 5. Identify ways to reduce evaporation from reservoirs. 6. Finding solutions to the problems of Water voracious plants. 7. Taking an idea of the safe discharges from underground irrigation tanks. 8. Study the basic relationships between soil and water. 9. Learn about the most important methods of measuring soil moisture. 10. Study of the flow of water in and through the soil. 11. Identify the problems of salinity in soil and water.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – irrigation principal</u> Irrigation in the world - irrigation since ancient times - dry areas in the world - definition of irrigation - precipitation - flood water - ground water [5 hrs] The Future of Growth and Expansion in Irrigation - Fields of Irrigation Science - Irrigation Economics [2 hrs] Irrigation water sources and storage - rainfall on valleys - studies of water resources - surveys in snowy areas and their benefits - surface reservoirs- Small dams - sedimentation (accumulation of sediments) in reservoirs - reduction of evaporation losses - problems of aquatic (aquatic plants) - industrial rain or sowing of clouds - development of river pumping Transferring. [5 hrs] saline water to fresh water - Importance of ground water (groundwater) - Feeding or recharging aquifers - Safe disposal of underground irrigation tanks Feasibility of groundwater development - changes in groundwater storage - groundwater studies

	and research. [5 hrs] Revision problem classes [2 hrs] <u>Part B – irrigation practices</u> Fundamentals 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- Surface tension - Tensile stresses (tension compressors) - Soil moisture stress - Soil moisture content - Soil water classification and availability (availability). [6 hrs] Fill the available ground water tank - the natural properties represented by the soil- Soil moisture measurement - Drilling of soil for soil samples - Soil resistance for penetration - Appearance and texture of soil as evidence of moisture content- Determination of moisture content of soil by weight method - Exploitation of electrical properties of porous mold - Tensiometers - Neutron method for soil moisture measurement - Thermal properties - Error in sample. [6 hrs] 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- . [6 hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Through this course, we try to help the student to understand the foundations of the irrigation process by learning everything related to irrigation water sources, and

	methods of ancient and modern irrigation, as well as linking the relationship between soil and water, and how water moves over and through the soil, while giving the student examples of all this from reality, with reference to The major irrigation projects in the city and the country and the irrigation methods used in each of them.
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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	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Irrigation in the world - irrigation since ancient times - dry areas in the world - definition of irrigation - precipitation - flood water - ground water
Week 2	The Future of Growth and Expansion in Irrigation - Fields of Irrigation Science - Irrigation Economics
Week 3	Irrigation water sources and storage - rainfall on valleys - studies of water resources - surveys in snowy areas and their benefits - surface reservoirs
Week 4	Small dams - sedimentation (accumulation of sediments) in reservoirs - reduction of evaporation losses - problems of aquatic (aquatic plants) - industrial rain or sowing of clouds - development of river pumping
Week 5	Transferring saline water to fresh water - Importance of ground water (groundwater) - Feeding or recharging aquifers - Safe disposal of underground irrigation tanks
Week 6	Feasibility of groundwater development - changes in groundwater storage - groundwater studies and research
Week 7	Soil and soil basic relationships - soil texture - soil structure (soil construction) - specific gravity (real weight) - specific weight
Week 8	Pore space - leaching - soil water input - permeability - soil depth - plant food compounds - soluble excess salts
Week 9	Surface tension - Tensile stresses (tension compressors) - Soil moisture stress - Soil moisture content - Soil water classification and availability (availability)
Week 10	Fill the available ground water tank - the natural properties represented by the soil
Week 11	Soil moisture measurement - Drilling of soil for soil samples - Soil resistance for penetration - Appearance and texture of soil as evidence of moisture content
Week 12	Determination of moisture content of soil by weight method - Exploitation of electrical properties of porous mold - Tensiometers - Neutron method for soil moisture measurement - Thermal properties - Error in sample
Week 13	Flow of water in and through soil - Energy in flowing water - Bases to measure pressure energies in saturated soil - Measuring soil permeability
Week 14	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 -

Week 15	Salinity problem in soil - Climate and salinity - Sources of soluble salts and their accumulation - Use of salt water in irrigation - Criteria for irrigation water validity
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	- Irrigation principles and practices , by V.E. Hansen ,O.W.Israelsen and G.F. Stringham, fourth edition, John Wiley and sons., 1980.	Yes
Recommended Texts	-Design manual for irrigation & drainage- ministry of irrigation-Iraq (pencil)	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	Concrete Design		Module Delivery		
Module Type	S		☒Theory ☒Lecture ☐Lab ☒Tutorial ☒Practical ☐Seminar		
Module Code	DWRE 314				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		UG3	Semester of Delivery		1
Administering Department		Dam and water resources	College	Engineering	
Module Leader	Dr. Saddam M AHMED		e-mail	Ahmed.saddam@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification		Ph.D.
Module Tutor	Nil		e-mail	Nil	
Peer Reviewer Name		Anmar A.M. Al-Talib	e-mail	Anmar.altalib@uomosul.edu.iq	
Scientific Committee Approval Date		1/9/2025	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	i. To understand concrete characteristics. ii. To understand safety and serviceability factors. iii. To understand the crack and uncrack concrete behavior. iv. To understand and apply engineering principles, science and mathematics to solve engineering problems.

	v. To understand the code provisions and enrich the design skills
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion of this course the student shall be able to assess the: 1. Mechanical properties of concrete, and reinforcements, (i) 2. Safety and serviceability provision, (ii) 3. Behavior of reinforced concrete at working and ultimate loads, (iii) 4. Analysis and Design of simple beams and slabs by working stress method, (iv, v) 5. Analysis and Design of simple beams and slabs by ultimate strength design method, (iv, v) 6. Analysis and design of T beam, Doubly reinforced beam and continuous beams by Ultimate strength design method (USD), (iv, v) 7. Shear strength in beams and design of shear reinforcement, (iv, v) 8. Behavior of reinforced concrete columns, (iv, v) 9. Analysis and Design of short columns, (iv, v) 10. Analysis and Design of flat slab, (iv, v) 11. Analysis and design of flat slab with drop panels, (iv, v) 12. Analysis and Design of footings, (iv, v) 13. Analysis and design of Two-way slab and beams, (iv, v) 14. Procurement for seismic resistance moment frames, (v)
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 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. [6hrs] Introduction, Flexural Analysis of Beams (working): Cracking Moment; Elastic Stresses—Concrete Cracked [6hrs] Introduction, Flexural Analysis of Beams (Ultimate): Ultimate Moment; Yield Stresses [6hrs] Strength Analysis of Beams According to ACI Code: Design Methods; Strains in Flexural Members; Balanced Sections, Tension-Controlled Sections, and Compression-Controlled. [6hrs] Design of Rectangular Beams and One-Way Slabs: Load Factors; Design of Rectangular Beams; One-Way Slabs [6hrs] 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 [6hrs]

	Shear and Diagonal Tension: Shear Stresses in Concrete Beams; Design for Shear. [6hrs] Introduction to columns, Flexural Analysis of short columns (under axial loads), Load carrying capacity of short columns, ties design. [6hrs] Short column under axial and bending actions, Interaction diagram (m-p curves). [6hrs] Design of short columns subjected to bending and axial loads according to ACI Code: Design Methods [6hrs] Design of flat slab with and without drop panels: Load Factors [6hrs] Design of Rectangular Beams and two-Way Slabs [6hrs] Design of footings, single, continuous and mat footings [6hr] Procuration for seismic resistance moment frames [6hrs] Design and analysis real case structures using computer software [6hrs]
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	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. Students are encouraged to use the Internet to search for various topics, including contents of similar courses offered elsewhere. MS Excel software is used for preparing projects. Students can reach the teaching material, solved problems, data sheets, past exam papers etc. on the allocated Web site.
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	The instructor will be happy to answer questions related to course content via email. Complex technical questions should be addressed in tutorial, during office hours, or by appointment. Emails must come from official University email addresses. The instructor will not respond to outside email addresses.
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Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time /Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	4, 9	LO #1- 7 and #8- 12
	Assignments	2	10% (10)	2, 12	LO # 4 and # 10
	Projects / Lab.	1	5% (5)	Continuous	All
	Report	3	15% (15)	4,8,12	LO # 4,8 and 12
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	LO # 1-13

Total assessment	100% (100 Marks)		
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Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	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.
Week 2	Introduction, Flexural Analysis of Beams (working): Cracking Moment; Elastic Stresses—Concrete Cracked
Week 3	Introduction, Flexural Analysis of Beams (Ultimate): Ultimate Moment; Yield Stresses
Week 4	Strength Analysis of Beams According to ACI Code: Design Methods; Strains in Flexural Members; Balanced Sections, Tension-Controlled Sections, and Compression-Controlled.
Week 5	Design of Rectangular Beams and One-Way Slabs: Load Factors; Design of Rectangular Beams; One-Way Slabs
Week 6	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
Week 7	Shear and Diagonal Tension: Shear Stresses in Concrete Beams; Design for Shear.
Week 8	Introduction to columns, Flexural Analysis of short columns (under axial loads), Load carrying capacity of short columns, ties design.
Week 9	Short column under axial and bending actions, Interaction diagram (m-p curves).
Week 10	Design of short columns subjected to bending and axial loads according to ACI Code: Design Methods
Week 11	Design of flat slab with and without drop panels: Load Factors
Week 12	Design of Rectangular Beams and two-Way Slabs
Week 13	Design of footings, single, continuous and mat footings
Week 14	Procuration for seismic resistance moment frames
Week 15	Design and analysis real case structures using computer software
Week 16	Preparatory week before the final Exam

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

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	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).	Yes
Recommended Texts	Gillesania, D.I.T. "FUNDAMENTALS OF CONCRETE DESIGN". Phils. DIT Gillesania, 2003. (can be downloaded from the Course web page).	yes
Websites	Google Classroom	
Grading Scheme		

مخطط الدرجات

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

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

Module Information					
معلومات المادة الدراسية					
Module Title	Principle of soil mechanics		Module Delivery		
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☒ Practical ☐ Seminar		
Module Code	DWRE315				
ECTS Credits	7.00				
SWL (hr/sem)	175				
Module Level		UG3	Semester of Delivery		1
Administering Department		Dam and water resources	College	Engineering	
Module Leader	Dr. Zuheir Karabash		e-mail	Karabash@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification		Ph.D.
Module Tutor	Ibrahim M. Alkiki Professor		e-mail	i.alkiki@uomosul.edu.iq	
Peer Reviewer Name		Anmar A.M. Al-Talib	e-mail	Anmar.altalib@uomosul.edu.iq	
Scientific Committee Approval Date		1/9/2025	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 course aims to provide students with the necessary background information about soil mechanics. The course aims to: 1- Provide students with a fundamental understanding of the principle of soil mechanics, soils' properties, states, behavior, and mechanics.

	2- Give students training on solving problems by applying the theories and principles in soil mechanics. 3- Solve problems based on phase relationships, and soil classification according to various international classification systems and determine the suitability of soils for engineering purposes. 4- Understand the principles of soil mechanics and its application: Flow of water through the soil, permeability, seepage. The principle of effective stress and its implications. Consolidation and calculate elastic and consolidation settlements. 5- Understand the soil improvement and stabilization techniques.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of this course, students will be able to: 1. Understand and implement the basic fundamentals of soil behavior. 2. Ability to solve problems related to soil mechanics, especially stress distribution, soil stabilization, water flow, and soil settlement. 3. Use modern soil mechanics equipment and soil investigation procedures. 4. Gain the ability to how to write professional, clear, concise technical reports. 5. Being able to identify and manage field problems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>1-Part A-Introduction and physical properties</u> Introduction, physical properties of soil, moisture content, density, void ratio, porosity and saturation, Atterberg limits and soil classification. [22 hrs] Revision problem classes [6 hrs] <u>2- Part B- Permeability and seepage</u> Permeability, seepage flow net construction, seepage through and under dams, seepage forces, and piping. [22 hrs] Revision problem classes [6 hrs] <u>3- Part C- Soil Stresses</u> The concept of total and effective stress and pore water pressure. [10 hrs] Revision problem classes [4 hrs] <u>4- Part D- Compressibility of the soil</u> Consolidation of soils, measurement of the consolidation of cohesive soils in the laboratory, theoretical consideration of amount and rate of settlement. [15 hrs] Revision problem classes [6 hrs] <u>5- Part E- Soil stabilization</u> Soil improvement and stabilization techniques. [10 hrs] Revision problem classes [4 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	A combination of theoretical classes and laboratory practical classes
	On completion of this course, the student will be able to: 1. Demonstrate ability to explain the multiphase nature of soils and to derive quantities relating to the volumes and masses of the different phases of a soil 2. Describe the ability to apply the effective stress concept to solve elementary geotechnical problems 3. Determine and classify soils. 4. Establish skills in soil permeability and compaction measurement and skills in the solution of seepage-related problems. 5. Developing the student's ability to make decisions in the field.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	3,7, 10	LO # 1 and 2
	Assignments	3	10% (10)	4,8, 11	LO # 2 and 4
	Lab	1	10% (10)	Continuous	LO # 3 and 5
	Report	11	10% (10)	Every week	LO # 4 and 5
Summative	Midterm Exam	2hr	10% (10)	7	LO # 1, 2 and 3

assessment	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 soil engineering
Week 2	Physico–mechanical properties of soil
Week 3	Soil classification
Week 4	Soil classification
Week 5	Permeability & seepage flow in soils
Week 6	Permeability & seepage flow in soils
Week 7	Permeability & seepage flow in soils
Week 8	Permeability & seepage flow in soils
Week 9	Stresses within soil mass (Internals Stresses)
Week 10	Stresses within soil mass (External Stresses)
Week 11	Consolidation and Compressibility of the soil
Week 12	Consolidation and Compressibility of the soil
Week 13	Consolidation and Compressibility of the soil
Week 14	Soil Stabilization
Week 15	Soil Stabilization
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction, and Visiting the Lab.
Week 2	Water content estimation and physical properties of the soil.
Week 3	Specific gravity of the soil.
Week 4-5	Grain size distribution of the soil.
Week 6-7	Atterberg limits
Week 8	Chemical tests of the soil.
Week 9-10-11	Consolidation test explanation and training.
Week 12	Swelling test.
Week 13	Collapse test.
Week 14	Compaction test.
Week 15	Field density test.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. "Principles of Geotechnical Engineering", (2007), Braja M. Das, 5th edition 2002, copyright by Wadsworth Group/United Stated. 2. "Principal of Soil Mechanic", (1991), Mohammed O. AL-Asho, (Book language in Arabic).	Yes
Recommended	1. "Elements of Soil Mechanics", (1988), G. N. Smith and Ion G. N. Smith, USA.	No

Texts	2."Problem Solving in Soil Mechanics", (2003), A. Aysen, Swets & Zeitlinger B.V	
Websites	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)	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	Statistical Methods in Hydrology		Module Delivery
Module Type	Suport		☐ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	DWRE 316		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UG3	Semester of Delivery	
Administering Department	Dams and Water Recourses	College	Engineering
Module Leader	Muhanad Talal Yousif	e-mail	Mohanad_ALsheer@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. Omer	e-mail	o.agha@uomosul.edu.iq
Scientific Committee Approval Date	1/9/2025	Version Number	1.0

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

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

Module Aims أهداف المادة الدراسية	17. To analysis of hydrological data. 18. To representation and graphical of hydrological data 19. This course deals with the basic concept of descriptive statistics for hydrological data. 20. To understand the meaning of probability theory. 21. To application the regression analysis and correlation on hydrological data.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	17. Discrimination between graphical of hydrological data and descriptive statistics for hydrological data. 18. Learn how to calculate the descriptive statistics for hydrological data. 19. Identify probability theory. 20. Explanation the regression analysis. 21. Define the correlation on hydrological data.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to statistical Hydrology; Definitions and Scope; Need of Statistical Methods; Hydrologic Processes; Hydrologic Variables. [16 hrs] Graphical Representation of Hydrologic Data; Dot Diagram; Histogram; Frequency Polygon and Cumulative Relative Frequency Diagram; Duration Curves; Bar Chart . [24 hrs] Numerical Summaries and Descriptive Statistics; Measures of Central Tendency; Mean; Median; Mode; Measures of Dispersion; Mean Absolute Deviation; Standard Deviation and variance. [24 hrs] Regression Analysis; Simple Linear Regression (SLR) and Curvilinear Regression; Model Transformable to Linear Regression, Correlation and Coefficient of Determination. [24 hrs]

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, 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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Student Workload (SWL)					
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا					
Structured SWL (h/sem)		33	Structured SWL (h/w)		2
الحمل الدراسي المنتظم للطالب خلال الفصل			الحمل الدراسي المنتظم للطالب أسبوعيا		
Unstructured SWL (h/sem)		17	Unstructured SWL (h/w)		2
الحمل الدراسي غير المنتظم للطالب خلال الفصل			الحمل الدراسي غير المنتظم للطالب أسبوعيا		
Total SWL (h/sem)		50			
الحمل الدراسي الكلي للطالب خلال الفصل					
Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	6, 9	LO #1
	Assignments	2	10% (10)	4, 14	LO #1
	Report	1	5% (5)	13	LO #1
	seminars	1	5% (5)	10	LO #1
Summative assessment	Midterm Exam	2 hr	10% (10)	12	LO # 1
	Final Exam	3hr	50% (50)	16	LO # 1
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to statistical Hydrology; Definitions and Scope; Need of Statistical Methods; Hydrologic Processes; Hydrologic Variables
Week 2	Graphical Representation of Hydrologic Data; Dot Diagram; Histogram; Frequency Polygon
Week 3	Cumulative Relative Frequency Diagram; Duration Curves; Bar Chart
Week 4	Numerical Summaries and Descriptive Statistics; Measures of Central Tendency; Mean; Median; Mode; Measures of Dispersion; Mean Absolute Deviation; Standard Deviation and variance
Week 5	Measures of asymmetry and tail weight; Coefficient of Skewness; Coefficient of Kurtosis;
Week 6	exam
Week 7	Random Events; Notion and Measure of Probability
Week 8	Conditional Probability, Law of Total Probability
Week 9	exam
Week 10	Seminar
Week 11	Regression Analysis; Simple Linear Regression (SLR),
Week 12	exam
Week 13	Curvilinear Regression;
Week 14	Model Transformable to Linear Regression,
Week 15	Correlation and Coefficient of Determination;
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the

		Library?
Required Texts	"Statistical Analysis of Hydrologic Variables". Ramesh S.V. Teegavarapu, Jose D. Salas and Jery R. Stedinger. Published by the American Society of Civil Engineers, 2019	Yes
Recommended Texts	"Statistical Methods in Hydrology and Hydroclimatology". Rajib Maity. Springer Transactions in Civil and Environmental Engineering. 2018	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	Numerical Analysis	Module Delivery
Module Type	Core	☒ Theory

Module Code	DWRE 321			☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		3	Semester of Delivery		2
Administering Department		Dams and water resources Department	College	College of Engineering	
Module Leader	Ali Ahmed Abdulmawjood		e-mail	aliabdulmawjood@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant lecturer	Module Leader's Qualification		Msc
Module Tutor			e-mail		
Peer Reviewer Name		Dr. Anmar Altalib	e-mail	anmar.altalib@uomosul.edu.iq	
Scientific Committee Approval Date		1/9/2025	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 primary aims of this course are to: 1. Familiarize students with numerical methods for solving complex mathematical problems, including numerical integration, differentiation, and the solutions of differential equations. 2. 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, such as Gaussian elimination, LU decomposition, Gauss-Seidel method, and Jacobi method, and their underlying principles.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of this course students will be able to: - The objectives of studying this module are to make the students familiarise with the ways of solving complicated mathematical problems numerically. (i) - Obtaining numerical solutions to problems of mathematics. (ii) - Describing and understanding of the several errors and approximation in numerical methods. (iii) - The understanding of several available Solutions of Equations in One Variable. (ii) - The explaining and understanding of the several available methods to Solve the simultaneous equations. (iii)
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Numerical Methods: Iteration and graphical method [5hr] Newton-Raphson's method and False position method [5hr] Taylor's series and Euler's method[5hr] Runge's -Kutta method [5hr] Indeterminate weight method and Integration method [5hr] Interpolation:Greagory Newton forward interpolation method [5hr] Gauss-Guadpruter method [5hr] Defintion, Forming,Order and Degree of Difference equations [10hr] Solution of Difference equations [5hr] Gauss, Jacopi's and Gauss-seidel method [5hr]

	Central differences [5hr]
	Derivative of Newton forward and backward differences [5hr]

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

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	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	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	Quizzes	2	10% (10)	5, 10	LO #1, 2 and 5
	Assignments	2	10% (10)	2, 12	LO # 3 and 4
	Projects / Lab.	10	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1 ,2 and 3
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Numerical Methods: Iteration and graphical method
Week 2	Newton-Raphson's method and False position method
Week 3	Taylor's series and Euler's method
Week 4	Runge's -Kutta method
Week 5	Indeterminate weight method and Integration method
Week 6	Interpolation:Gregory Newton forward interpolation method
Week 7	Gauss-Guadpruter method
Week 8	Defintion, Forming,Order and Degree of Difference equations
Week 9	Defintion, Forming,Order and Degree of Difference equations

Week 10	Solution of Difference equations
Week 11	Gauss, Jacobi's and Gauss-seidel method
Week 12	Central differences
Week 13	Central differences
Week 14	Derivative of Newton forward and backward differences
Week 15	Derivative of Newton forward and backward differences
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Numerical Analysis	Yes
Recommended Texts	Numerical Analysis By Dass	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	Open Channels		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	DWRE 322		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UG3	Semester of Delivery	
Administering Department	DWR	College	ENG
Module Leader	Dr. Mena Ahmed Alsawaf	e-mail	m.alsawaf@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 Altalib	e-mail	anmar.altalib@uomosul.edu.iq
Scientific Committee Approval Date	1/9/2025	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Hydraulic (DWRE 311)	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	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 10. Recognize the main typed of pumps used in water resources engineering and how the connect each other and define the main requirements to design the right one
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	12. Recognize types of open channel and the theoretical equation related to each. 13. Understand the flow variables affected to design an open channel. 14. Summarize the energy of flow and how move with flow. 15. Discuss the usage of closed channel and how to design, and compute the energy dissipated 16. Describe the phenomenon “hydraulic jump” and indicate its danger when care does not take to deal with it on a structure like dam 17. Define the critical depth, subcritical flow and super critical flow and indicate when and where they happen in reality 18. Identify the raise or decrease in water level due to change in channels and compute the effect of back water curve 19. Discuss the requirements and limitation to design a weir and its usage 20. Discuss types to compute discharge from a weir and correct the readings 21. Explain the time consumed to empty a reservoir by weir or notch. 22. Identify the main view and characteristic of using a software related to open channel (HEC-RAS).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Analyzing the flow in open channel</u> Defining the main variables affected on the flow of open channel and learn the right theoretical way to deal with each case, such as Manning equation and Chezy equation in trapezoidal channel or rectangular, classify the channel, learn the consideration of hydraulic radius and Manning coefficient, study hydraulic jump, energy dissipated. [20 hrs] <u>Part B – Designing an Open Channel</u> Design a channel with best hydraulic section, design a channel in different shapes, design a channel with critical flow, design a channel affected by back water curve, design a weir to empty a reservoir, correct its variables, design a structures to measure the discharge in an irregular open channel or natural. [48 hrs] <u>Part C – Software</u> Apply the principles of flow in open channel with different structures in case of steady or unsteady flow in an application relevant to channel (HEC-RAS). [10 hrs]

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, class works 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 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	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (10)	4, 8, 12	LO #1, 2, 10 and 11
	Assignments	5	15% (15)	2,4,6,8,10	LO # 3, 4, 6 and 7
	Projects / Lab.	0	-	-	-
	Report	-	-	-	-
	Monthly exam	2	20% (20)	6,13	all
Summative	Midterm Exam	2 hr	10% (10)	7	LO # 1-6

assessment	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Open channel, types and classifications.
Week 2	Uniform flow, Chezy and Manning equations.
Week 3	Best hydraulic cross section
Week 4	Consecration of hydraulic radius and Manning coefficient
Week 5	Specific energy and critical depth.
Week 6	Critical depth with humps or contractions
Week 7	Hydraulic jump
Week 8	Varied flow
Week 9	water surface profile
Week 10	Weirs and notches
Week 11	Empirical Formulae for Discharge Over Rectangular Weir
Week 12	Time Required to empty a Reservoir or a Tank with Rectangular and Triangular Weirs or Notches
Week 13	Measurement of Flow of Irregular Channels
Week 14	Software: HEC-RAS, steady flow in channels
Week 15	Software: HEC-RAS, unsteady flow in channels
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	

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	Rajput, R.K., 2004. <i>A textbook of fluid mechanics and hydraulic machines</i> . S. Chand Publishing.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering	

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	Groundwater Hydrology		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	DWRE 323		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	
Administering Department	Dams and Water Resources	College	Engineering
Module Leader	Dr.Rasha M. Sami Fadhil	e-mail	Rasha.fadhil@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PhD
Module Tutor		e-mail	
Peer Reviewer Name	Anmar A.M. Al-Talib	e-mail	
Scientific Committee Approval Date	1/9/2025	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	Groundwater hydrology is essential for third-stage dams and water resources engineering students in order to • identify the properties of artesian wells and describe the conditions under which they form; • explain the difference between porosity and permeability; • list and describe the properties of aquifers that control the movement and storage of groundwater; • use Darcy's Law to explain the roles of aquifer properties and driving forces in governing the rate of groundwater flow; • apply the concept of hydraulic head to draw flowlines on maps and cross sections; • interpret the current and historical balance between groundwater recharge and water extraction from well hydrographs;
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Overview of essential concepts encountered in hydrological systems. • An ability to distinguish, identify, define , formulate and solve engineering problems by applying principles of engineering science and mathematics. • Learning role of groundwater flow modelling within hydrogeology and consequently water resources management • Learning the mathematical basis of groundwater flow models (Darcy's law, conservation of mass/energy) and solve issue associated with the treatment of wells • The key components of groundwater flow models and the typical workflow of groundwater flow modelling, with emphasis on application using software.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • General introduction - groundwater cycle. (4hrs) • Groundwater aquifers in Iraq . (4hrs) • Definitions and terms. (4hrs) • Groundwater movement laws. (6hrs)

	• The steady state of flow in wells. (4hrs) • Unsteady flow condition. (6hrs) • overlapping wells. (6hrs) • The imaginary well theory. (4hrs) • Pumping check. (4hrs) • Well drilling. (4hrs) • Flow network and groundwater mapping. (6hrs) • The relationship of rainfall with the groundwater level and data documentation. (4hrs)
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The essential strategy of this module is to motivate students about applying theory of groundwater occurrence and movement; groundwater extraction, replenishment, and protection; knowing the underlying principles of methods applied to groundwater exploration and pumping tests; building numerical models for groundwater flow. Ability to use software for simulating Groundwater.
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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	22	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem)	100		

الحمل الدراسي الكلي للطلاب خلال الفصل	
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Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
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)	3,5,7,10,13	All
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	General introduction - What is Groundwater? Groundwater and the Water Cycle Groundwater aquifers in Iraq: Importance of Groundwater, Groundwater Scenario: Global Perspectives Global Mapper software.
Week 2	Definitions and terms: Aquifer Properties, Types of Aquifers, Confined aquifer Unconfined aquifer, Leaky aquifer, Perched Aquifers Properties of Aquifers, Porosity, Specific yield, Coefficient of permeability Global Mapper software.
Week 3	Groundwater movement laws: Darcy's Law, Hydraulic Conductivity, Transmissibility Excel Coding.

Week 4	The steady state of flow in wells: Analysis of Steady Groundwater Flow, Steady Flow in Confined Aquifers
Week 5	- Steady Flow in Unconfined Aquifers ,Steady Unconfined Flow without Recharge or Evapotranspiration Excel Coding
Week 6	Equations of Motion, Confined Groundwater Flow Confined Groundwater Flow between Two water Bodies, Unconfined Flow by Dupit's Assumption
Week 7	First monthly exam
Week8	Hydraulics of Wells, Drawdown in Wells, Steady Flow into a Well Confined Flow-Unconfined Excel Coding
Week 9	Flow- Functions of Wells, Classification of Water Wells, Open Wells-Tube wells
Week 10	The imaginary well theory. GMS software
Week 11	Pumping check. Well flow near aquifer boundaries-Well flow near an Impermeable boundaries -Multiple Well System- GMS software GMS software
Week 12	Flow network and groundwater mapping. GMS software
Week13	Well drilling- penetration speed, diameter of the bit, depth of the hole and level of vibration. GMS software
Week 14	The relationship of rainfall with the groundwater level and data documentation. GMS software
Week 15	Second monthly exam .
Week 16	The preparatory week before the Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Groundwater hydrology (2005) by Todd,D.K., Mays, L. W. Wiley Ground	Yes
Recommended Texts	Groundwater hydrology-Conceptual and computational Models (2003)by K.R.Rushton published by Wiley	Yes
Websites	https://ocw.mit.edu/courses/1-72-groundwater-hydrology-fall-2005/ https://ocw.mit.edu/courses/1-72-groundwater-hydrology-fall-2005/pages/lecture-notes/	

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	Groundwater Hydrology		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	DWRE 323		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level		UG3	
Administering Department		Dams and Water Resources	College
Module Leader		Dr.Rasha M. Sami Fadhil	e-mail
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification
Module Tutor			e-mail
Peer Reviewer Name		Anmar A.M. Al-Talib	e-mail
Scientific Committee Approval Date		1/9/2025	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	Groundwater hydrology is essential for third-stage dams and water resources

أهداف المادة الدراسية	engineering students in order to • identify the properties of artesian wells and describe the conditions under which they form; • explain the difference between porosity and permeability; • list and describe the properties of aquifers that control the movement and storage of groundwater; • use Darcy's Law to explain the roles of aquifer properties and driving forces in governing the rate of groundwater flow; • apply the concept of hydraulic head to draw flowlines on maps and cross sections; • interpret the current and historical balance between groundwater recharge and water extraction from well hydrographs;
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Overview of essential concepts encountered in hydrological systems. • An ability to distinguish, identify, define , formulate and solve engineering problems by applying principles of engineering science and mathematics. • Learning role of groundwater flow modelling within hydrogeology and consequently water resources management • Learning the mathematical basis of groundwater flow models (Darcy's law, conservation of mass/energy) and solve issue associated with the treatment of wells • The key components of groundwater flow models and the typical workflow of groundwater flow modelling, with emphasis on application using software.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • General introduction - groundwater cycle. (4hrs) • Groundwater aquifers in Iraq . (4hrs) • Definitions and terms. (4hrs) • Groundwater movement laws. (6hrs) • The steady state of flow in wells. (4hrs) • Unsteady flow condition. (6hrs) • overlapping wells. (6hrs)

	• The imaginary well theory. (4hrs) • Pumping check. (4hrs) • Well drilling. (4hrs) • Flow network and groundwater mapping. (6hrs) • The relationship of rainfall with the groundwater level and data documentation. (4hrs)
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The essential strategy of this module is to motivate students about applying theory of groundwater occurrence and movement; groundwater extraction, replenishment, and protection; knowing the underlying principles of methods applied to groundwater exploration and pumping tests; building numerical models for groundwater flow. Ability to use software for simulating Groundwater.
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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	22	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	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)	3,5,7,10,13	All
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	General introduction - What is Groundwater? Groundwater and the Water Cycle Groundwater aquifers in Iraq: Importance of Groundwater, Groundwater Scenario: Global Perspectives Global Mapper software.
Week 2	Definitions and terms: Aquifer Properties, Types of Aquifers, Confined aquifer Unconfined aquifer, Leaky aquifer, Perched Aquifers Properties of Aquifers, Porosity, Specific yield, Coefficient of permeability Global Mapper software.
Week 3	Groundwater movement laws: Darcy's Law, Hydraulic Conductivity, Transmissibility Excel Coding.
Week 4	The steady state of flow in wells: Analysis of Steady Groundwater Flow, Steady Flow in Confined Aquifers
Week 5	- Steady Flow in Unconfined Aquifers ,Steady Unconfined Flow without Recharge or Evapotranspiration Excel Coding

Week 6	Equations of Motion, Confined Groundwater Flow Confined Groundwater Flow between Two water Bodies, Unconfined Flow by Dupit's Assumption
Week 7	First monthly exam
Week8	Hydraulics of Wells, Drawdown in Wells, Steady Flow into a Well Confined Flow-Unconfined Excel Coding
Week 9	Flow- Functions of Wells, Classification of Water Wells, Open Wells-Tube wells
Week 10	The imaginary well theory. GMS software
Week 11	Pumping check. Well flow near aquifer boundaries-Well flow near an Impermeable boundaries -Multiple Well System- GMS software GMS software
Week 12	Flow network and groundwater mapping. GMS software
Week13	Well drilling- penetration speed, diameter of the bit, depth of the hole and level of vibration. GMS software
Week 14	The relationship of rainfall with the groundwater level and data documentation. GMS software
Week 15	Second monthly exam .
Week 16	The preparatory week before the Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Groundwater hydrology (2005) by Todd,D.K., Mays, L. W. Wiley Ground	Yes
Recommended Texts	Groundwater hydrology-Conceptual and computational Models (2003)by K.R.Rushton	Yes

	published by Wiley	
Websites	https://ocw.mit.edu/courses/1-72-groundwater-hydrology-fall-2005/ https://ocw.mit.edu/courses/1-72-groundwater-hydrology-fall-2005/pages/lecture-notes/	

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	Drainage Engineering		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	DWRE 324				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UG3	Semester of Delivery		1
Administering Department		DWRE	College	COE	
Module Leader	Dr. Ahmed A. M. Al-Ogaidi		e-mail	a.alogaidi@uomosul.edu.iq	
Module Leader’s Acad. Title		Lecturer	Module Leader’s Qualification		Ph.D.
Module Tutor	-----		e-mail	-----	
Peer Reviewer Name		Dr. Anmar Altalib	e-mail	anmar.altalib@uomosul.edu.iq	
Scientific Committee Approval Date		1/9/2025	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. To introduce the students to the agricultural drainage required to enhance the field production, and to create a balance among water, air, and salts contents in the soil. 2. To learn general principles of groundwater hydraulics such as Darcy's law, Dupuit-Forchheimer method, and groundwater flow in layered soils. 3. To manage and reclaim the saline soils by leaching 4. To investigate drainage projects. 5. To evaluate soil hydraulic conductivity in field and in laboratory. 6. To understand different types of drainage systems and their planning. 7. To design the cross-section of surface and subsurface drains.

	8. To choose the proper distance between drains. 9. To understand the vertical drainage. 10. To maintain drainage systems. 11. To understand the effect of drainage on environment.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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: 1. Definition of drainage, its purpose, evidence and benefits, as well as an overview of the history of drainage in Iraq. 2. Learn the basics of groundwater movement by studying Darcy's law, Laplace's equation, and Dupuis-Forchheimer's equation. 3. Learn about the reclamation of saline soils, salts removal, and the requirements for leaching them. 4. Learn the exploratory and design investigations of drainage projects. 5. Studying the various methods used to estimate the hydraulic conductivity of soils in the laboratory and field. 6. Identifying the different drainage systems through their types, planning their locations and depths, and designing filters. 7. Learn the basics of designing surface (open) and subsurface (covered) drainage sections. 8. Designing the distances between the drains in the case of stable and unstable flow. 9. Identifying the vertical drainage (drainage wells). 10. Learn drainage maintenance. 11. The relationship between drainage and environmental pollution.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: <u>General introduction on drainage of agricultural lands</u> Definition of drainage, purpose of drainage, evidences of drainage problems, drainage benefits, drainage in Iraq, and sources of excess water in soil. [5 hrs] <u>Principles of groundwater hydraulics</u> Introduction, Law of energy conservation, groundwater potential, Darcy's law, Law of mass conservation, Laplace's equation, and Dupuit-Forchheimer equation. [10 hrs] <u>Reclamation of saline soils</u> The origin and nature of saline soils, Factors helping to increase the concentration of salts in agricultural soils, distribution and movement of salts in soil, the critical depth of groundwater, classification of saline soils, reclamation methods of saline soils, and soil leaching and leaching requirements. [10 hrs] <u>Drainage projects' investigations</u> Exploratory investigations, design investigations, and groundwater investigations. [5 hrs] <u>Estimation of soil hydraulic conductivity</u> Introduction, laboratory methods of soil hydraulic conductivity estimation, and field methods of soil hydraulic conductivity estimation. [10 hrs] <u>Drainage systems</u> Introduction, types of drainage networks, planning drains' positions, patterns of drainage network distribution, drain depths, accompanying works to subsurface drainage network, and filters (envelopes). [5 hrs] <u>Design of drains' sections</u>

	Introduction, drainage coefficient, design of open drains' sections, and design of pipe drains diameters. [5 hrs]
	<u>Spacing between drains</u>
	Introduction, equations used in specifying drains' spacing, equations based on steady-state flow condition, and equations based on unsteady-state flow condition. [15 hrs]
	<u>Vertical drainage (drainage wells)</u>
	Introduction, types of drainage wells, advantages of vertical drainage, disadvantages of vertical drainage, groundwater flow towards drainage walls, and overlapping among drainage wells. [5 hrs]
	<u>Drains' maintenance</u>
	Introduction, maintenance of open drains, maintenance of buried drains, and maintenance of drainage wells.
	<u>Drainage and water pollution</u>
	Introduction, effect of return water on domestic water uses, effect of return water on industrial water uses, effect of return water on fish water life, effect of return water on entertainment water uses, and methods of return water controlling. [5 hrs]

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 محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150
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Module Evaluation تقييم المادة الدراسية					
		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	16% (16)	5, 10	LO #1 – 8
	Assignments	7	16% (16)	2, 12	LO #2, 3, 5 – 9
	Lab.	1	8% (8)	5 & 13	LO #3, 8
Summative assessment	Midterm Exam	2 hr	10% (10)	10	LO #1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	General introduction on drainage of agricultural lands: Definition of drainage, purpose of drainage, evidences of drainage problems, drainage benefits, drainage in Iraq, and sources of excess water in soil.
Weeks 2-3	Principles of groundwater hydraulics: Introduction, Law of energy conservation, groundwater potential, Darcy's law, Law of mass conservation, Laplace's equation, and Dupuit-Forchheimer equation.
Weeks 4-5	Reclamation of saline soils: The origin and nature of saline soils, Factors helping to increase the concentration of salts in agricultural soils, distribution and movement of salts in soil, the critical depth of groundwater, classification of saline soils, reclamation methods of saline soils, and soil leaching and leaching requirements.

Week 6	Drainage projects' investigations: Exploratory investigations, design investigations, and groundwater investigations.
Weeks 7-8	Estimation of soil hydraulic conductivity: Introduction, laboratory methods of soil hydraulic conductivity estimation, and field methods of soil hydraulic conductivity estimation.
Week 9	Drainage systems: Introduction, types of drainage networks, planning drains' positions, patterns of drainage network distribution, drain depths, accompanying works to subsurface drainage network, and filters (envelopes).
Week 10	Design of drains' sections: Introduction, drainage coefficient, design of open drains' sections, and design of pipe drains diameters.
Weeks 11-13	Spacing between drains: Introduction, equations used in specifying drains' spacing, equations based on steady-state flow condition, and equations based on unsteady-state flow condition.
Week 14	Vertical drainage (drainage wells): Introduction, types of drainage wells, advantages of vertical drainage, disadvantages of vertical drainage, groundwater flow towards drainage walls, and overlapping among drainage wells.
Week 15	Drains' maintenance: Introduction, maintenance of open drains, maintenance of buried drains, and maintenance of drainage wells. Drainage and water pollution: Introduction, effect of return water on domestic water uses, effect of return water on industrial water uses, effect of return water on fish water life, effect of return water on entertainment water uses, and methods of return water controlling.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 5	Lab 1: Laboratory estimation of soil hydraulic conductivity
Week 13	Lab 2: Training on a software of computing drain spacing

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	هندسة البزل، د. عبد الستار يونس الدباغ، أنغام عز الدين علي (1992).	Yes

	Drainage Engineering, James N. Luthin (1973).	
Recommended Texts	البزل، د. محسن محارب عواد اللامي، د. علاء صالح عبد الجبار الجنابي (1991). Irrigation and drainage engineering, Peter Waller, Muluneh Yitayew (2016).	No
Websites	http://ecoursesonline.iasri.res.in/course/view.php?id=550	

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	Soil Mechanics and Foundations		Module Delivery		
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☒ Practical ☐ Seminar		
Module Code	DWRE325				
ECTS Credits	5.0				
SWL (hr/sem)	125				
Module Level		UG3	Semester of Delivery		2
Administering Department		Dam and water resources	College	Engineering	
Module Leader	Ibrahim M. Alkiki		e-mail	i.alkiki@uomosul.edu.iq	
Module Leader's Acad. Title		Professor	Module Leader's Qualification		Ms.C
Module Tutor	Dr. Zuheir Karabash		e-mail	Karabash@uomosul.edu.iq	
Peer Reviewer Name		Anmar A.M. Al-Talib	e-mail	Anmar.altalib@uomosul.edu.iq	
Scientific Committee Approval Date		1/9/2025	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- The course aims to give students the knowledge to understand the theory of shear strength of the soil. 2- The issue of engineering soil problems and how to improve the soil to raise its bearing capacity, reduce subsidence, and avoid the problems of swelling and fallout, and the effects of gypsum and saline soils will also be discussed. 3- to understand the concept of lateral earth pressures of soils and retaining wall.

	4-To develop problem-solving skills and understanding of foundation engineering theory through the application of techniques. To provide students with exposure to systematic methods for designing foundations. 5-To discuss and evaluate the feasibility of foundation solutions to different types of soil conditions considering the time effect on soil behavior. 6- To understand the structural design of different types of shallow foundations. 7-To Calculate the ultimate pile capacity in the sand and in clay. To calculate the ultimate pile capacity of group piles and assess pile group efficiency. To estimate settlement of single and group piles.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the shear strength behavior of the soil and find the shear parameters which are important in the calculation of the bearing capacity of the soil. 2. Calculate the lateral earth pressure and the lateral force that is applied on the retaining walls which is essential for designing the retaining walls and for the factor of safety against failure. 3. Use modern soil mechanics equipment and soil investigation procedures. 4. Gain the ability to how to write professional, clear, concise technical reports. 5. Design different types of shallow foundations structurally. Calculate the bearing capacity of shallow foundations erected on clays and sands. Calculate bearing capacity of shallow foundations subjected to moment 6. Understand the structural design of foundations. 7. Calculate the ultimate pile capacity in the sand. Calculate ultimate pile capacity in soils. Calculate single and group pile settlements.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - <u>Part A- Soil investigation</u> Introduction to the foundation engineering, and soil investigation methods and preparation of the investigation reports.[10] Revision problem classes [2 hrs] - <u>Part B -Shear strength of the soil</u> Shear strength theory, parameters of the shear strength, failure mechanism, plane of failure, stresses on the planes in soil, Mohr's circle and Mohr's envelope of failure, laboratory and field shear strength tests.[12] Revision problem classes [6 hrs] - <u>Part C – Bearing capacity of shallow foundations</u> Type of foundations, bearing capacity equations (Terzaghi equation,

	Hansen equation, Meyerhof equation, Vesic equation), bearing capacity of foundation on sand, bearing capacity of foundation on clay, bearing capacity of foundation subjected to moment. [12 hrs] Revision problem classes with problem-solution discussions [6 hrs] <u>- Part D – Design of earth retaining structures</u> - Estimation the lateral earth pressure, Design of gravity retaining walls, design of cantilevered retaining walls, overturning stability, sliding stability, bearing capacity of retaining walls [12 hrs] Design problem-solution discussions [6 hrs] <u>- Part E – Deep foundation: Ultimate pile capacity</u> Type of deep foundations, ultimate pile capacity in sand, ultimate pile capacity in clay, pile capacity of group piles, group pile efficiently [10 hrs] Revision problem classes with problem-solution discussions [2 hrs] <u>-Part F – Structural design of shallow foundations</u> Types of foundations, structural design of spread footing, structural design of continuous footing, structural design of combined footing, structural design of trapezoidal and strap footings, structural design of raft foundations. [10 hrs] - Design problems [2 hrs]
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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 type of simple experiments involving some sampling activities that are interesting to the students.

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

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction and general information.
Week 2	Soil investigation and description.
Week 3	Shear strength of the soil.
Week 4	Shear strength of the soil.
Week 5	Shear strength of the soil.
Week 6	Bearing capacity of the soil.
Week 7	Bearing capacity of the soil.
Week 8	Bearing capacity of the soil.
Week 9	Lateral earth pressure of the soil.
Week 10	Lateral earth pressure of the soil.
Week 11	Retaining walls.
Week 12	Deep foundation.
Week 13	Deep foundation.
Week 14	Foundation structural design.

Week 15	Foundation structural design.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to laboratory
Week 2	Unconfined compression test
Week 3-4	Direct shear test- explain and training
Week 5-6-7	Triaxial shear test- explain and training
Week 8-9	Vane shear test.
Week 10-11	Standard penetration test.
Week 12-13	Cone penetration test.
Week 14-15	Plate load bearing test.
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	3. "Principles of Geotechnical Engineering", (2004), Braja M. Das, 5th edition 2002, copyright by Wadsworth Group/United Stated. 4. "Principal of Soil Mechanic", (1991), Mohammed O. AL-Asho, (Book language in Arabic). 4- الشكرجي ، يوسف والمحمدي، نوري، " هندسة الأسس " ، جامعة بغداد ، الطبعة الاولى، 1985.	Yes
Recommended Texts	3. " Elements of Soil Mechanics", (1988), G. N. Smith and Ion G. N. Smith, USA. 4. " Problem Solving in Soil Mechanics", (2003), A. Aysen, Swets & Zeitlinger B.V. 3. Bowles, J.E., P.E., S.E., " Foundation Analyses and Design ", The McGraw-Hill Companies, Inc, 5th ed., 2006. 4. -Peak, R. B., Hanson, W. E. and Thorburn, T.H., " Foundation Engineering ", John Wiley and Sons, 2nd ed., 1974 5. Das, B. M., "Principle of Foundation Engineering ", Thomson Books/Cole, California State University, Sacramento, 5th ed.,	No

	2004. 6. Das, B. M., & Sivakugan, N., " Principles of foundation engineering ", Cengage learning, 2018.	
Websites	No	

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

Module Information					
معلومات المادة الدراسية					
Module Title	Consumptive use and water duty		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☒ Practical ☐ Seminar		
Module Code	326				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UG3	Semester of Delivery		2
Administering Department		Dam and water resources	College	Engineering	
Module Leader	Dr.Anmar Abdulaziz Majeed Al-Talib		e-mail	Anmar.altalib@uomosul.edu.iq	
Module Leader’s Acad. Title		Assistant Professor	Module Leader’s Qualification		Ph.D.
Module Tutor	Ass.Lec.Alaa Ismaeel Naser		e-mail	E-mail	
Peer Reviewer Name		Anmar A.M. Al-Talib	e-mail	Anmar.altalib@uomosul.edu.iq	
Scientific Committee Approval Date		1/9/2025	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	1.To understand Consumptive use and water duty.

أهداف المادة الدراسية	2. To understand Penman monteth equation and other methods. 3. To understand the Irrigation efficiencies. 4.To understand the Irrigation frequency and amount of water. 5. To understand the Irrigation methods . 6. To understand the Principles of Irrigation networks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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 Consumptive use 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 . 12.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Consumptive use</u> Absolute water consumption - transpiration - evaporation - conditions affecting water consumption - direct measurements of water consumption - Hargreaves equation - water consumption of natural plants, Calculation of water consumption reference ETo for crops using the Benman Monteth equation [5 hrs] Find crop coefficient Kc for different plants and calculate water Consumptive use of crop ETc, - Meteorology as a guide for water Consumptive use - Plani - Creedli method - Jensen - Hayes method Climate and plant physiology (functions of plant members) and their relevance to water Consumptive use [5 hrs] Plant growth season - Water Consumptive use needs for crops during the growing season - Practical considerations. [2 hrs] 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. [5 hrs]
	Revision problem classes [2 hrs]
	<u>Part B – water duty</u>
	Fundamentals
	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. [6 hrs] 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. [6 hrs] 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. [6 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Through this semester we will try to teach the student how to calculate the value of

	the reference water Consumptive use of the plant and then learn how to draw the crop coefficient curve and thus how to calculate the water Consumptive use of the crop using more than one method in the calculations and compare them and choose the best according to the weather data available to us and then the student will be able to choose Crops suitable for cultivation, defining the agricultural plan in the field or project, and calculating the water standard that will enable the student to determine the seasonal amount of water needed for the field or project. The student will also learn how to calculate the different irrigation efficiencies for the purpose of choosing the appropriate irrigation method for the field, which will be determined by the topography and the physical properties of the soil.
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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	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 6 and 7
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	5% (5)	Continuous	All
	Report	3	15% (15)	4,8,12	LO # 2,5 and 7

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Absolute water consumption - transpiration - evaporation - conditions affecting water consumption - direct measurements of water consumption - Hargreaves equation - water consumption of natural plants
Week 2	Calculation of water consumption reference ETo for crops using the Bennett Monteth equation
Week 3	Find crop coefficient Kc for different plants and calculate water consumption of crop ETc
Week 4	- 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
Week 5	Plant growth season - Water consumption needs for crops during the growing season - Practical considerations
Week 6	When to irrigate - and how much water to apply, the soil moisture endpoints, the external appearance of the crop
Week 7	Use of various crops for water, available water resources, winter irrigation, Autumn irrigation
Week 8	Soil moisture removal by plant roots, moisture content effect on soil dehumidification rate
Week 9	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
Week 10	The method of irrigation during the fruiting period, depth of the root area, irrigation frequency (irrigation rotation)
Week 11	irrigation efficiency, water transfer efficiency, water application efficiency , water use efficiency, water storage efficiency
Week 12	Efficiency of water distribution, efficiency of water consumption,

	Examples of irrigation efficiencies
Week 13	sprinkler irrigation, other uses of sprinkler networks, basic conditions for sprinkler irrigation system design, sprinkler network design
Week 14	Drip irrigation, the benefits of drip irrigation, potential problems of drip irrigation
Week 15	Surface irrigation and underground irrigation (under surface) Free flooding without control, submerged slides, submerged docks, internal irrigation, hydraulic surface irrigation,
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	- Irrigation principles and practices , by V.E. Hansen ,O.W.Israelsen and G.F. Stringham, fourth edition, John Wiley and sons., 1980.	Yes
Recommended Texts	1-Crop evapotranspiration –guide lines for computing crop water requirements (FAO – 56)(1998) 2--Crop water requirements (FAO – 24)(1974)	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	Engineering Project Design & Planning			Module Delivery	
Module Type	S			☐ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	DWRE 327				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		3	Semester of Delivery		2
Administering Department		Dams and Water Recourses	College	Engineering	
Module Leader	Dr. Anmar Abdulaziz Al-Talib		e-mail	anmar.altalib@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	Module Leader's Qualification		Ph.D.
Module Tutor	Dr. Zeyad Ayoob Sulaiman		e-mail	z.alsinjari@uomosul.edu.iq	
Peer Reviewer Name		Dr. Omer	e-mail	o.agha@uomosul.edu.iq	
Scientific Committee Approval Date		1/9/2025	Version Number		1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• Understand the nature and characteristics of engineering projects and comprehend the engineering project life cycle and its different phases. • Systematically analyze engineering problems to identify their root causes. • Acquire the ability to define project scope and identify stakeholders. • Participate in the preparation of preliminary plans for engineering projects in terms of time, resources, and risks. • Understand the specific characteristics of water resources engineering projects and their technical and environmental complexities. • Develop analytical thinking and engineering decision-making skills to prepare graduates for effective participation in the planning and implementation of engineering projects and provide a foundation for postgraduate courses in project management and engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• LO1: Explain the concept and characteristics of engineering projects and distinguish between engineering projects and operational activities. • LO2: Describe the stages of the engineering project life cycle and explain the objectives of each stage. • LO3: Analyze engineering problems and identify their root causes using systematic analytical methods. • LO4: Define project scope accurately and identify stakeholders and analyze their roles and influence. • LO5: Apply engineering design methodology and generate appropriate design alternatives for engineering projects. • LO6: Develop a Work Breakdown Structure (WBS) and decompose the

	project into manageable activities. • LO7: Prepare a preliminary project schedule and estimate durations of engineering activities. • LO8: Analyze the Critical Path Method (CPM) and identify critical activities and their impact on project duration. • LO9: Plan human and material resources and define responsibilities within the engineering project. • LO10: Identify potential risks in engineering projects, evaluate them, and propose mitigation measures. • LO11: Apply monitoring and evaluation techniques to compare actual performance with planned performance and take corrective actions. • LO12: Explain the specific characteristics of water resources engineering projects in terms of planning, execution, and environmental risks. • LO13: Explain the principles of engineering ethics and relate them to sustainability concepts in projects. • LO14: Review, integrate, and apply the acquired concepts and theories of the course in an integrated manner.
Indicative Contents المحتويات الإرشادية	• Introduction to Engineering Projects: Concept and characteristics of engineering projects vs. operational activities. • Engineering Project Life Cycle: Stages, phases, and objectives of each stage. • Problem Analysis: Engineering problem analysis and root cause identification. • Scope and Stakeholder Management: Project scope definition, stakeholder identification, role analysis, and influence. • Engineering Design Methodology: Design process and alternatives generation. • Work Breakdown Structure (WBS): Project decomposition into manageable activities. • Project Scheduling: Activity duration estimation and preliminary schedule preparation. • Critical Path Method (CPM): Critical path analysis, identifying critical activities, and project duration impact. • Resource Management: Human and material resource planning, matrix of

	responsibilities. • Risk Management: Risk identification, evaluation, and mitigation strategies in engineering projects. • Project Monitoring and Evaluation: Performance measurement, baseline vs. actual comparison, and corrective action plans. • Water Resources Engineering Projects: Specific characteristics, planning, execution, and environmental risks. • Ethics and Sustainability: Engineering ethics principles and sustainable project development.
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Core 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. • Active Participation & Critical Thinking: The course emphasizes encouraging active student participation, analytical thinking, and critical thinking. • Practical Linkage: Focuses on directly linking theoretical management and design concepts with practical applications in water resources engineering projects. • Skill Development: Aims to develop students' practical skills in problem-solving, root cause analysis, engineering decision-making, and teamwork.

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	2
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	Report	1	10% (10)	13	LO #1
	seminars	1	10% (10)	10	LO #1
Summative assessment	Midterm Exam	2 hr	30% (30)	12	LO # 1
	Final Exam	3hr	50% (50)	16	LO # 1
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Explain the concept and characteristics of engineering projects and distinguish between engineering projects and operational activities
Week 2	Describe the stages of the engineering project life cycle and explain the objectives of each stage
Week 3	Analyze engineering problems and identify their root causes using systematic analytical methods
Week 4	Define project scope accurately and identify stakeholders and analyze their roles and influence

Week 5	Apply engineering design methodology and generate appropriate design alternatives for engineering projects
Week 6	Develop a Work Breakdown Structure (WBS) and decompose the project into manageable activities
Week 7	Prepare a preliminary project schedule and estimate durations of engineering activities
Week 8	Analyze the Critical Path Method (CPM) and identify critical activities and their impact on project duration
Week 9	Plan human and material resources and define responsibilities within the engineering project
Week 10	Identify potential risks in engineering projects, evaluate them, and propose mitigation measures
Week 11	Apply monitoring and evaluation techniques to compare actual performance with planned performance and take corrective actions
Week 12	Explain the specific characteristics of water resources engineering projects in terms of planning, execution, and environmental risks
Week 13	Explain the principles of engineering ethics and relate them to sustainability concepts in projects
Week 14	Review and integrate course concepts and prepare for the final evaluation through discussion and analysis
Week 15	Apply the acquired concepts and theories of the course in an integrated manner
Week 16	Preparatory week before the final examination

Learning and Teaching Resources				
مصادر التعلم والتدريس				
	Text		Available in the Library?	
Required Texts	Project Management Institute, PMBOK Guide.		Yes	
Recommended Texts	• Chitkara, K. K., Engineering Project Management		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
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