



"COURSE PORTFOLIO"

Module Information معلومات المادة الدراسية					
Module Title	Mathematics III			Module Delivery	
Module Type	Basic			☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	QWRE2616				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		2	Semester		3
Department		Water Resources Engineering	College	College of Engineering	
Module Leader	NOORA SALIM ALWAN		E-mail	Noora.salim@wrec.uoqasim.edu.iq	
Module Leader's Acad. Title		Assist Professor	Module Leader's Qualification		Ph.D.
Module Tutor	NOORA SALIM ALWAN		e-mail	Noora.salim@wrec.uoqasim.edu.iq	
Peer Reviewer Name		N.A.	e-mail	N.A.	
Scientific Committee Approval Date		25/10/2023	Version Number	1.0	

Student Workload (SWL): Structured SWL (h/w) (Two contact hours of lectures) + Unstructured SWL (h/w) .

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	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		



Relation with other Modules: -

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

COURSE DESCRIPTION:	This course helps the students to use the mathematics in solving different engineering problems later on in their studies.
Module Aims أهداف المادة الدراسية	The purpose of this course is to introduce the basic concepts and principles of Mathematic II. Then, to apply this knowledge to solve different mathematical problems such as polar, differential equation and complex number. This will help student to design and analysis different engineering cases especially in analytical engineering. The different means used in studying mathematic.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the completion of the course, students are expected to be able to: 1. Knowing how to convert from polar coordinates and its applications. 2. An ability to deal with double and triple integrations. 3. Solving differential equations with different types (first order and second order) 4. Understanding partial differentiation and its applications. 5. Knowing about the complex number.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Advanced Engineering Mathematics 8Ed - Erwin Kreyszig 2. Advanced Mathematics for Engineering and Science C F Chan Man Fong, D De Kee, Tulane University, USA, P N Kaloni University of Windsor, Canada.

COURSE SCHEDULE:-

Topic I: -			
1-4	١٢	Polar coordinates, Double integral, Triple integral and Application of multiple integral	1,2
Topic II: -			
5-8	١٢	Differential equations (first order, second order)	3

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Topic III: -			
9-12	١٢	Partial Differentiation	4
Topic IV: -			
13-15	٩	Complex number	5
Final Exam			

Learning Outcomes and Assessment Methods

Topics Covered	Learning Outcomes	ABET Outcomes	Assessment Methods
Topic I: -	1,2	a, b, c, d and e	quizzes, discussions during lectures, Written Exams.
Topic II: -	3	a, b ,c and f	quizzes, Home work.
Topic III: -	4	a, b and f	Discussions during lectures. Written Exams, Home work.
Topic IV: -	5	a, b and f	quizzes, discussions during lectures, Home work.

Module Evaluation:-

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment (40%)	Quizzes	٣	30% (30)	٣,٧, 10	ALL
	Assignments & H.W.	6	5% (5)	2,6,9,12	ALL
	Discussions During Lectures	5	5% (5)	Continuous	ALL
Summative	Midterm Exam	2hr	10% (10)	12	ALL

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assessment (60%)	(10%)				
	Final Exam (50%)	3hr	50% (50)	16	ALL
Total assessment			100% (100 Marks)		

توزيع الساعات المجدولة و الغير مجدولة (SWL= SSWL +USWL)

Activity types	Structured SWL	Un structured USWL	No. of weeks	Time Factor	SWL (hr)
Class	Class Lecturers		15	6	90
Lab.					
Tutorial			15	2	30
Self Study		Self Study	15	2	30
Quizzes		Preparation for the Quizzes	3	4	12
discussions during lectures			5	1	5
Projects / Lab.	Project Work		0	0	0
		Preparation for the Project	0	0	0
Seminar	Presenting a Seminar		0	0	0
		Preparation for the Project			
Assignments, Homework		Preparation for the H.W.	6	2	12
Report		Preparation for the Report	0	0	0
Midterm Exam (10%)		Preparation for the Exam.	1	5	5
	Evaluation		1	1	1
Final Exam (50%)		Preparation for the Exam.	1	12	12
	Evaluation		1	3	3
Total SWL (hr/ Semester)					225
ECTS					9

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"COURSE PORTFOLIO"

Module Information معلومات المادة الدراسية			
Module Title	Fluid Mechanics 1		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	QWRE2617		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester	3
Department	Water Resources Engineering	College	College of Engineering
Module Leader	Thaer Hashem rasheed	E-mail	thair.hashim@wrec.uoqasim.edu.iq
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name	N.A.	e-mail	N.A.
Scientific Committee Approval Date		Version Number	1.0

Student Workload (SWL): Structured SWL (h/w) (Two contact hours of lectures+2hr lab+1hr tutorial) + Unstructured SWL (h/w) .

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	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		



Relation with other Modules: -

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

COURSE DESCRIPTION:	this fluid mechanics course equips students with a comprehensive understanding of fluid properties, behavior, and the principles governing forces and motion. The curriculum provides both theoretical knowledge and practical applications, preparing students to address a wide range of engineering and scientific challenges related to fluid systems.
Module Aims أهداف المادة الدراسية	Fluid Properties: The goal is to familiarize students with the fundamental properties of fluids, including density, viscosity, and specific weight, enabling them to comprehend the unique characteristics of both liquids and gases. Fluid Statics: This module aims to teach students the principles of fluid behavior at rest (hydrostatics), empowering them to calculate fluid pressures and analyze fluid pressure distribution in various scenarios. Forces on Surfaces: Students will learn how to calculate forces exerted by fluids on both plane and curved surfaces, facilitating their ability to assess and predict fluid-induced forces on structures and objects. Buoyancy: The objective is to explain the principles of buoyancy, equipping students with the knowledge to predict when objects will float or sink in fluids and how to compute buoyant forces. Fluid Dynamics: This section intends to provide an



	understanding of the dynamic behavior of moving fluids, including flow patterns, viscosity, and the distinctions between laminar and turbulent flow. 6. Continuity Equation: Students will learn to apply the continuity equation to analyze fluid flow, ensuring the preservation of mass in various fluid systems. 7. Energy Equation: The aim is to introduce students to the energy equation and its practical applications, enabling them to evaluate energy changes within fluid systems and make use of this knowledge in the design and analysis of fluid systems. 8. Momentum Equation: Students will become proficient in using the momentum equation to analyze fluid forces and motion, with a focus on its practical applications in engineering and scientific contexts
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completing these topics in fluid mechanics, students will: 1- Understand essential fluid characteristics for various applications 2- Analyze and predict fluid pressure in static systems, essential for designing structures and assessing buoyancy. 3- Calculate and analyze forces exerted by fluids on both flat and curved surfaces, aiding in engineering and design. 4- Determine the buoyancy of objects in fluids, crucial for understanding floating and sinking phenomena. 5- Differentiate flow patterns and comprehend factors influencing fluid behavior. 6- Apply mass conservation principles to analyze and optimize fluid systems. 7- Evaluate energy changes in fluid systems, particularly in the context of pumps, turbines, and heat exchangers. 8- Assess fluid forces and motion in various conduits, enhancing problem-solving skills in fluid mechanics.

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Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1-Fluid Mechanics, Victor L. Streeter& Benjamin Wylie. 2-Fluid Mechanics with Engineering Applications, Robert L. Danpherty, Joseph B. Franzini &E. Johon Finnemor. 3-Fluid Mechanics for Engineers, Maurice L. Albertson, James R. Barton &Darly B. Simon.
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COURSE SCHEDULE:-

Week	hours	Topics Covered	Learning Outcomes
Topic1			
1,2	4	Fluid properties	1
Topic 2			
3		Fluid Static: Pressure variation in static fluid	2
Topic 3			
4,5		Forces on plane surface	3
Topic 4			
6,7		Forces on curved surface	3
Topic 5			
8		Buoyancy	4
Topic 6			
9		Fluid dynamic : Kinematic of fluid motion	5
Topic 7			
10		Continuity Equation	6

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Topic 8			
11,12,13		Energy Equation and its applications	7
Topic 9			
14,15		Momentum Equation and its applications	8
Final Exam			

Learning Outcomes and Assessment Methods

Topics Covered	Learning Outcomes	Strategies for Achieving Outcomes	Assessment Methods
Topic 1: Fluid properties	1	Problem Based Learning, Critical thinking questions, Theoretical Lectures, tutorials, Small Group Discussions,	quizzes, HomeWorks, discussions during lectures reports
Topic 2: Fluid Static: Pressure variation in static fluid	2	Problem Based Learning, Critical thinking questions, Theoretical Lectures, tutorials, Small Group Discussions,	quizzes, HomeWorks, discussions during lectures, Written Exams.
Topic 3: Forces on plane surface	3	Problem Based Learning, Critical thinking questions, Theoretical Lectures, tutorials, Small Group Discussions,	quizzes, HomeWorks, discussions during lectures, Written Exams.
Topic 4: Forces on curved surface	3	Problem Based Learning, Critical thinking questions, Theoretical Lectures, tutorials, Small Group Discussions,	quizzes, HomeWorks, discussions during lectures, Written Exams.
Topic 5: Buoyancy	4	Problem Based Learning, Critical thinking questions, Theoretical Lectures, tutorials, Small Group Discussions,	quizzes, HomeWorks, discussions during lectures, Written Exams.
Topic 6: Fluid dynamic : Kinematic of fluid motion	5	Problem Based Learning, Critical thinking questions, Theoretical Lectures, tutorials, Small Group Discussions,	quizzes, HomeWorks, discussions during lectures, Written Exams.
Topic 7: Continuity Equation	6	Problem Based Learning, Critical thinking questions, Theoretical	quizzes, HomeWorks, discussions during lectures,



		Lectures, tutorials, Small Group Discussions,	Written Exams.
Topic 8: Energy Equation and its applications	7	Problem Based Learning, Critical thinking questions, Theoretical Lectures, tutorials, Small Group Discussions,	quizzes, HomeWorks, discussions during lectures, Written Exams.
Topic 9: Momentum Equation and its applications	8	Problem Based Learning, Critical thinking questions, Theoretical Lectures, tutorials, Small Group Discussions,	quizzes, HomeWorks, discussions during lectures, Written Exams.

Module Evaluation:-

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment (40%)	Quizzes	٣	30% (30)	٣,٧, 10	ALL
	Assignments & H.W.	4	5% (5)	2,6,9,12	ALL
	Discussions During Lectures	5	5% (5)	Continuous	ALL
Summative assessment (60%)	Midterm Exam (10%)	2hr	10% (10)	12	ALL
	Final Exam (50%)	3hr	50% (50)	16	ALL
Total assessment			100% (100 Marks)		

توزيع الساعات المجدولة و الغير مجدولة (SWL= SSWL +USWL)

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Activity types	Structured SWL	Un structured USWL	No. of weeks	Time Factor	SWL (hr)
Class	Class Lecturers		15	2	30
Lab.	Lab.		15	2	30
Tutorial	Tutorial		15	1	15
Self Study		Self Study	15	2	30
Quizzes		Preparation for the Quizzes	3	4	12
discussions during lectures			5	1	5
Projects / Lab.	Project Work		0	0	0
		Preparation for the Project	0	0	0
Seminar	Presenting a Seminar		0	0	0
		Preparation for the Project			
Assignments, Homework		Preparation for the H.W.	4	2	8
Report		Preparation for the Report	0	0	0
Midterm Exam (10%)		Preparation for the Exam.	1	5	5
	Evaluation				
Final Exam (50%)		Preparation for the Exam.	1	12	12
	Evaluation		1	3	3
		Total SWL (hr/ Semester)			150
		ECTS			6

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Module Information معلومات المادة الدراسية			
Module Title	Engineering Surveying		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar
Module Code	QWRE2618		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester	3
Department	Water Resources Engineering	College	College of Engineering
Module Leader	Hayder Abd Al-Razzaq Abd Dibs	E-mail	Dr.hayderdibs@wrec.uoqasim.edu.iq
Module Leader's Acad. Title	Asst. Prof. Dr.	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. MAYTHAM KADHIM OBAID	e-mail	maytham@wrec.uoqasim.edu.iq
Peer Reviewer Name	N.A.	e-mail	N.A.
Scientific Committee Approval Date		Version Number	1.0

Student Workload (SWL): Structured SWL (h/w) (Two contact hours of lectures) + Unstructured SWL (h/w) .

Student Workload (SWL)			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5.2
Unstructured SWL (h/sem)	72	Unstructured SWL (h/w)	4.8
Total SWL (h/sem)	150		



Relation with other Modules: -

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	
COURSE DESCRIPTION:	Introduction to the elements of the discipline of surveying, with concentration on applications for the construction process. Included are topics on: the background and history of the surveying profession and how it interacts with other disciplines; measurement concepts, error consideration, accuracy, precision, and significant figures; methods for distance measuring; elevation measurements and leveling.
Module Aims أهداف المادة الدراسية	1. Identify the principles of surveying engineering. 2. Identify the isotopes included within it. 3. Identifying surveying devices of all types, electronic and non-electronic, and using them in various engineering projects, especially those related to water resources, their management and monitoring. 4. Learn about the applications of surveying engineering in the field of water resources.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowledge of the principles of engineering surveying. 2. Identify the types of engineering surveying. 3. Getting to know the different surveying devices. 4. Learn about the applications of engineering surveying in projects and research related to water resources. 5. Use different surveying devices. 6. Learn about surveying techniques and how to use them in serving water resources projects. 7. The possibility of identifying techniques, methods, and surveying devices and harnessing them according to the type of project.
Indicative Contents المحتويات الإرشادية	8. Elementary Surveying an Introduction Geomatics By Charles D. Ghilani. Paul R. Wolf/Thirteen Edition 2019. 9. Springer Handbook of Geographic Information Kresse, Danko (Eds Springer-Verlag Berlin Heidelberg 2019). 10. Highway Surveying Manual / Washington State Department of Transportation Environmental and Engineering Service Center 2015. 11. BASIC SURVEYING -THEORY AND PRACTICE Ninth Annual Seminar



	Presented by the Oregon Department of Transportation Geometronics Unit Bend, Oregon. 12. Surveying/ Dr A M Chandra Prof. of Civil Engineering NEW AGE Indian Institute of ideology Roorke. 13. Planning Surveying / Fawzi Al-Khalisi.
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COURSE SCHEDULE:-

Week	hours	Topics Covered	Learning Outcomes
Topic I			
1		Introduction - Basic concepts of surveying.	1,3
Topic II			
2,3		Types of surveying. Basic Principles of Surveying. Importance of Surveying. Classification of surveying. Distance adjustment. Errors in taping. Accuracies. Traditional Measurements in Surveying.	2, 3,6
Topic III			
4		Measuring principles. Units of measurement. Meteorological corrections. Vertical control.	1,2
Topic IV			
5		Distance: Methods of measuring distances. Traditional Tools of Measuring the Horizontal Distances. Other uses of the tape. Electromagnetic distance measurement (EDM).	4,5
Topic V			
6,7		Styles of measuring horizontal distances using measuring tape. Styles of measuring horizontal distances using measuring tape. Sources of error in taping. Mistakes. Random and Systematic errors. Mid-term Exam.	4,5
Topic VI			
8,9		Leveling. Leveling purposes. Definitions of main terms. Calculate the elevation of differential leveling using the leveling staff.	4,5



10		Leveling: Methods and type of leveling. Types of the leveling instruments. Level staff (leveling rod).	4,5,6
Topic VIII			
11		Differential leveling. Definitions. Profile leveling.	4, 5
12		Staking and station the reference line. Profile types. Correction elevations of profile.	4, 5
13		Angles: Types of angles. Methods of measuring angles	4, 5
14		The relationship between angles. Instrumental errors. Instrument adjustment.	4, 5
15		Convert the angle type to another.	4,5,6,7
Final Exam			

Learning Outcomes and Assessment Methods

Topics Covered	Learning Outcomes	Strategies for Achieving Outcomes	Assessment Methods
1	1,3	Problem Based Learning, Critical thinking questions.	discussions during lectures
2	2,3,6,7	Theoretical Lectures, tutorials.	discussions during lectures.
3	1,2	Critical thinking questions, Theoretical Lectures, tutorials.	Quizzes, Home works
4	4,5,7	Theoretical Lectures, Small Group Discussions.	Quizzes, Major reports, discussions during lectures, Home works
5	4, 5	Theoretical Lectures, Discussions,	Quizzes, Home works
6	4,5,6,7	Theoretical Lectures, Small Group Discussions.	Quizzes, Home works
7	4,5,6,7	Theoretical Lectures, Discussions.	Quizzes, Home works

Module Evaluation:-

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	30% (30)	3, 9, 10	ALL
	Lab work	4	5% (5)	2,6,9,12	ALL
	Discussions	5	5% (5)	Continuous	ALL

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(40%)	During Lectures				
Summative assessment (60%)	Midterm Exam (10%)	2hr	10% (10)	12	ALL
	Final Exam (50%)	3hr	50% (50)	16	ALL
Total assessment			100% (100 Marks)		

توزيع الساعات المجدولة و الغير مجدولة (SWL= SSWL +USWL)

Activity types	Structured SWL	Un structured USWL	No. of weeks	Time Factor	SWL (hr)
Class	78	72	15	2	30
Lab.			15	2	30
Tutorial			15	1	15
Self Study		Self Study	15	2	30
Quizzes		Preparation for the Quizzes	1	2	2
discussions during lectures			6	1	6
Projects / Lab.	Project Work		0	0	0
		Preparation for the Project	0	0	0
Seminar	Presenting a Seminar		2	2	4
		Preparation for the Project			
Assignments, Homework		Preparation for the H.W.	3	1	3
Report		Preparation for the Report	5	3	15
Midterm Exam (10%)		Preparation for the Exam.	1	1	10
	Evaluation		1	1	1
Final Exam (50%)		Preparation for the Exam.	3	1	3
	Evaluation				
		Total SWL (hr/ Semester)			150
		ECTS			6



"COURSE PORTFOLIO"

Module Information معلومات المادة الدراسية			
Module Title	Design of Irrigation Networks		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	QWRE3619		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester	3
Department	Water Resources Engineering	College	College of Engineering
Module Leader		E-mail	
Module Leader's Acad. Title	Professor	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	13/10/2023	Version Number	1.0

Student Workload (SWL): Structured SWL (h/w) (Two contact hours of lectures) + Unstructured SWL (h/w) .

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		



Relation with other Modules: -

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

COURSE DESCRIPTION:

This course "Design of Irrigation Networks" focuses on providing students with the knowledge and skills to plan and design efficient irrigation systems for agricultural purposes. The course covers various aspects of irrigation network design, incorporating principles, agronomy, and environmental science. Below are principles and a general outline of the topics that might be covered in such a course:

Introduction to Irrigation:

Overview of irrigation and its importance in agriculture

Types of irrigation systems (e.g., surface irrigation, drip irrigation, sprinkler irrigation)

Crop water requirements:

Understanding the water needs of different crops

Evapotranspiration and factors affecting it.

Soil-Water-Plant Relationships:

Soil properties and their impact on water retention and movement

Plant water uptake mechanisms.

Hydraulic Principles:

Fluid flow and pressure in pipes

Pumping systems and their efficiency

Irrigation System Components:

Design and selection of pumps, pipes, valves, and fittings

Selection of appropriate emitters in drip irrigation

Hydraulic Network Analysis:

Pressure and flow calculations in the irrigation network

Determination of pipe sizes and system layout.

Water Quality and Treatment:

Analysis of water quality for irrigation

Methods for water treatment and filtration.



Module Aims أهداف المادة الدراسية	The goal of this course is to equip students with a solid foundation in comprehensive planning of the Reservoir Types of dams and their characteristics types of irrigation projects Networks. Define Canals design, analysis, types. criteria and principles of Berm. classification of Irrigation Water Resources
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After the course, students are expected to be able to: 1. Define and differentiate various types of irrigation projects. 2. Analyze factors influencing the selection of irrigation project. 3. Demonstrate the principles and conventions for naming and numbering canals and drains in irrigation projects. 4. Identify and describe the key structures of irrigation projects. 5. Develop comprehensive layouts for irrigation networks. 6. Define and calculate irrigation efficiency metrics, including water use efficiency and application efficiency. 7. Analyze the water requirements of crops based on factors such as crop type, growth stage, and local climate. 8. Define subsurface irrigation methods and buried pipe systems. 9. Analyze the advantages, disadvantages, and suitability of subsurface irrigation methods. 10. Explain the components and operation of a sprinkler irrigation system. 11. Design a sprinkler irrigation system. 12. Describe the components and functioning of a drip irrigation system. 13. Develop a drip irrigation system design. 14. Identify and analyze the factors influencing the selection of irrigation methods. 15. Classify and describe different types of canals. 16. Analyze the purpose and design of canal. 17. Identify the key variables in design of canals. 18. Explain the significance of canal slope of irrigation canals. 19. Calculate and apply the appropriate slope of canals. 20. Compare and contrast different methods of designing canals, such as Kennedy's theory, Lacey's theory, and the Manning's formula. 21. Classify sediment types and describe their impact on canal design and maintenance. 22. Analyze the factors influencing the selection of berm width in canal



design.

23. Apply criteria to determine appropriate berm width.
24. Describe the components and functions of canal embankments or banks.
25. Analyze the role of embankments in providing structural stability and controlling water flow in canals.
26. Identify and explain the mechanisms by which seepage can lead to the failure of canal banks.
27. Define canal lining and its significance in irrigation canal design.
28. Factors Responsible for Selecting a Particular Type of Lining:
29. Analyze factors such as soil characteristics, water quality, and budget constraints that influence the choice of canal lining.
30. Explain the importance of proper canal alignment in irrigation system design.
31. Define precipitation and its significance in the water cycle.
32. Analyze the spatial and temporal distribution of precipitation in different regions.
33. Atmospheric Water Other Than Precipitation:
34. Describe sources of atmospheric water, excluding precipitation, such as humidity and dew.
35. Explain the impact of atmospheric water on local climates and ecosystems.
36. Define floodwater and its role in water resource management.
37. Define groundwater and explain its importance in irrigation.
38. Classify soil moisture levels and describe the implications for plant growth.
39. Analyze the impact of soil moisture on irrigation scheduling.
40. Define and quantify soil moisture range.
41. Analyze the variations in soil moisture levels.
42. Define irrigation water quality and its key parameters.
43. Analyze the impact of water quality on soil and crop productivity.
44. Explain the concept of water requirements for crops.
45. Define consumptive use and its relevance to water management.
46. Calculate consumptive water use.
47. Explain the concept of evapotranspiration in plants.
48. Analyze methods for determining evapotranspiration (Blaney-Criddle Method, Modified Penman Method).
49. Define duty, delta, and base period in the context of irrigation water management.



Indicative Contents

المحتويات الإرشادية

Indicative content includes the following.

"Irrigation Engineering" by N.N. Basak

"Irrigation: Principles and Practices" by Frederick R. Troeh and Louis J. Donatelle

"Irrigation Engineering and Hydraulic Structures" by Santosh Kumar Garg
structures. CRC Press.

COURSE SCHEDULE: -

Week	hours	Topics Covered	Learning Outcomes
1. Topic I: Irrigation Networks			
1-4	4	• Classification of irrigation projects • Nomenclature a numbering of canals and drains • Irrigation Project Structures • Layout of irrigation networks. • Irrigation Efficiency. • Irrigation Requirements •	1,2,3,4,5,6 and 7
		• Subsurface irrigation methods • Sprinkler Irrigation System • Drip Irrigation System • Factors affecting choice of method of irrigation and Drainage. • Canal Cross Section • Design Of Irrigation Canal System.	8,9,10,11,12,13 and 14
2- Topic II: - Canals			
5-7	4	• Types of canals • The variable must be known in design. • The properties of canal slope.	15,16,17,18,19,20 and 21



		• Methods of Design canals. • Sediment classes. • Water way design.	
3- Topic III: - Berm			
8-12	4	• Basic Definitions • Criteria for Selecting berm width. • Embankment or Bank. • The failure in bank is caused by seepage. • Canal Lining. • The factors responsible for selecting particular type of lining. • Types of lining. • Canal Alignment.	22,23,24,25,26,27,28,29 and 30
4- Topic IV: - Irrigation Water Resources			
13-15	4	• Precipitation. • Atmospheric water other than precipitation. • Flood water. • Ground water • Soil Moisture Classification. • Soil Moisture Range. • Irrigation Water Quality • Water Requirement of Crops. • Influence of crop type on crop water needs. • Consumptive Use of Water. • Determination of Evapotranspiration. • Blaney- Criddle method. • Modified Penman Method. • Duty-Delta Base period relationship.	31,32,33,34,35,36,37,38, 39,40,41,42,43,44,45,46,47,48 and 49.
Final Exam			



Learning Outcomes and Assessment Methods for "introduction to Water Resource Engineering" Course.

Topics Covered	Learning Outcomes	Strategies for Achieving Outcomes	Assessment Methods
Topic I: Irrigation Networks	1,2,3,4,5,6 and 7	Report Writing, Field Visits, Scientific Trips, Theoretical Lectures, Small Group Discussions, Scientific Films, Exploratory Work Teams.	Major reports, discussions during lectures. Written Exams,
Topic II: - Canals	15,16,17,18,19,20 and 21	Problem Based Learning, Report Writing, Field Visits, , Theoretical Lectures, Small Group Discussions, Scientific Films.	Quizzes, discussions during lectures, Written Exams, , oral exams.
Topic III: - Berm	22,23,24,25,26,27,28,29 and 30	Problem Based Learning, Report Writing, Theoretical Lectures, Small Group Discussions, Scientific Films.	Quizzes, discussions during lectures, Written Exams, Home work.
Topic IV: - Irrigation Water Resources	31,32,33,34,35,36,37,38, 39,40,41,42,43,44, 45,46,47,48 and 49.	Report Writing, Scientific Trips. Theoretical Lectures, Small Group Discussions, and Scientific Films.	Major reports, discussions during lectures. Written Exams.

Module Evaluation: -

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment (40%)	Quizzes	2	10% (10)	8, 13	6,7, and 12
	Assignments & H.W.	4	10% (10)	4,6,10,12	3,5,9,11
	Field Visits Report	1	10% (10)	10	3,7,8
	Discussions During Lectures	10	10% (10)	Continuous	ALL
Summative assessment	Midterm Exam (10%)	2 hr	10% (10)	8	1,2,3,4,5,6,7
	Final Exam (50%)	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



(SWL= SSWL +USWL) توزيع الساعات المجدولة و الغير مجدولة

Activity types	Structured SWL	Un structured SWL	No. of weeks	Time Factor	SWL (hr)
Class	Class Lecturers		15	3	60
Lab.					
Tutorial	Class Lecturers		15	1	15
Self Study		Self Study	15	2	30
Quizzes		Preparation for the Quizzes	2	2	4
discussions during lectures			0	0	0
Assignments, Home Work		Preparation for the H.W.	4	1	4
Report		Preparation for the Report	1	2	2
Midterm Exam (10%)		Preparation for the Exam.	1	8	8
	Evaluation		0	0	
Final Exam (50%)		Preparation for the Exam.	1	14	14
	Evaluation		1	3	3
		Total SWL (hr/ Semester)			150
		ECTS			6



"COURSE PORTFOLIO"

Module Information معلومات المادة الدراسية					
Module Title	COMPUTER APPLICATIONS			Module Delivery	
Module Type	Support			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	QWRE2420				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		2	Semester		3
Department		Water Resources Engineering	College	College of Engineering	
Module Leader	NOORA SALIM ALWAN		E-mail	Noora.salim@wrec.uoqasim.edu.iq	
Module Leader's Acad. Title		Assistant Professor	Module Leader's Qualification		PHD
Module Tutor	N.A.		e-mail	N.A.	
Peer Reviewer Name		N.A.	e-mail	N.A.	
Scientific Committee Approval Date		01/06/2023	Version Number	1.0	

Student Workload (SWL): Structured SWL (h/w) (Two contact hours of lectures) + Unstructured SWL (h/w) .

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		



Relation with other Modules:-

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

COURSE DESCRIPTION:	Programming is a fundamental skill that is essential for technology influences, such as artificial intelligence, robotics, and cybersecurity. In this class, students will learn how to program in different languages and environments, and how to apply their programming skills to solve real-world problems in various engineering domains, such as mechanical, electrical, and civil engineering.
Module Aims أهداف المادة الدراسية	- To introduce the students to the basic concepts and features of MATLAB, such as variables, arrays, functions, loops, conditional statements, and plots. - To enable the students to use MATLAB as a tool for scientific computing, such as solving equations, performing calculus operations, manipulating matrices and vectors, and working with symbolic expressions. - To develop the students' programming skills and problem-solving abilities using MATLAB, such as writing scripts, creating functions, debugging code, and applying algorithms to real-world problems. - To expose the students to various engineering applications of MATLAB, such as data analysis, visualization, simulation, optimization, and interfacing with other software and hardware.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the completion of the course, students are expected to be able to: - By the end of this module, students will be able to use MATLAB as a tool for scientific computing, such as solving equations, performing calculus operations, manipulating matrices and vectors, and working with symbolic expressions. - By the end of this module, students will be able to develop their programming skills and problem-solving abilities using MATLAB, such as writing scripts, creating functions, debugging code, and applying algorithms to real-world problems. - By the end of this module, students will be able to demonstrate their understanding of the basic concepts and features of MATLAB, such as variables, arrays, functions, loops, conditional statements, and plots. - By the end of this module, students will be able to explore various



	engineering applications of MATLAB , such as data analysis, visualization, simulation, optimization, and interfacing with other software and hardware
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1- "MATLAB Programming for Engineering", Stephen J. Chapman 2- " An Introduction to Programming and Numerical Methods in MATLAB " , S.R. Ottand J.P. Denier

COURSE SCHEDULE:-

Week	hours	Topics Covered	Learning Outcomes
Topic I			
1	4	<i>Introduction To Programming And Matlab</i>	1, 3, 4
2	4	<i>Structure Of Matlab Software</i>	1, 3, 4
3	4	<i>Fundamentals Of Programming</i>	1, 3, 4
4	4	<i>Fundamentals Of Programming</i>	1, 3, 4
5	4	<i>Input And Output Statements</i>	1, 3, 4
6	4	<i>Mathematical Expressions And Number Format</i>	1, 3, 4
7	4	<i>Mathematical Expressions And Number Format</i>	2, 3, 4,
8	4	<i>Applications (Discussion , Solve New Exercises In Strength Of Materials And Other Examples)</i>	
Topic II			
9,10,11	4	<i>Vectors And Their Properties</i>	1, 2,3,4
Topic III			
12,13,14,15	4	<i>Vectors And Matrices</i>	1, 3, 4
Final Exam			

Learning Outcomes and Assessment Methods for "introduction to Water Resource Engineering" Course.

Topics Covered	Learning Outcomes	Strategies for Achieving Outcomes	Assessment Methods
<i>Topic 1; Introduction To Programming And Matlab</i>	1,2,3,4,	Report Writing, Field Visits, Scientific Trips, Theoretical Lectures, Small Group	Major reports, discussions during lectures. Written



		Discussions, Exploratory Work Teams.	Exams,
Topic II: Vectors And Their Properties	2,3,4	Problem Based Learning, Report Writing, Field Visits, Theoretical Lectures, Small Group Discussions,	Quizzes, discussions during lectures, Written Exams, , oral exams.
Topic III : Vectors And Matrices	10,11,12,13,14, 15, and 16	Problem Based Learning, Report Writing, Theoretical Lectures, Small Group Discussions	Quizzes, discussions during lectures, Written Exams, Home work.

Module Evaluation:-

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment (40%)	Quizzes	2	10% (10)	8, 13	6,7, and 12
	Assignments & H.W.	4	10% (10)	4,6,10,12	3,5,9,11
	Field Visits Report	1	10% (10)	10	3,7,8
	Discussions During Lectures	10	10% (10)	Continuou s	ALL
Summative assessment	Midterm Exam (10%)	2 hr	10% (10)	8	1,2,3,4,5,6,7
	Final Exam (50%)	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

(SWL= SSWL +USWL) توزيع الساعات المجدولة و الغير مجدولة

Activity types	Structured SWL	Un structured SWL	No. of weeks	Time Factor	SWL (hr)
Class	Class Lecturers		15	4	60
Lab.					
Tutorial					
Self Study		Self Study	15	2	30

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Quizzes		Preparation for the Quizzes	2	2	4
discussions during lectures			0	0	0
Assignments, Home Work		Preparation for the H.W.	4	1	4
Report		Preparation for the Report	1	2	2
Midterm Exam (10%)		Preparation for the Exam.	1	8	8
	Evaluation		0	0	
Final Exam (50%)		Preparation for the Exam.	1	14	14
	Evaluation		1	3	3
		Total SWL (hr/ Semester)			125
		ECTS			5

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"COURSE PORTFOLIO"

Module Information			
معلومات المادة الدراسية			
Module Title	جرائم نظام البعث في العراق		Module Delivery
Module Type	Support		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	QWRE1221		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	Semester	3
Department	Water Resources Engineering	College	College of Engineering
Module Leader	Ahmed Abd Al-Jassim Nazzal	E-mail	ahmed.1994@uoqasim.edu.iq
Module Leader's Acad. Title	Asst. Lecturer	Module Leader's Qualification	MSC.
Module Tutor	N.A.	e-mail	N.A.
Peer Reviewer Name	N.A.	e-mail	N.A.
Scientific Committee Approval Date		Version Number	1.0

Student Workload (SWL): Structured SWL (h/w) (Two contact hours of lectures) + Unstructured SWL (h/w) .

Student Workload (SWL)			
Structured SWL (h/sem)	33	Structured SWL (h/w)	2.2
Unstructured SWL (h/sem)	17	Unstructured SWL (h/w)	1.1
Total SWL (h/sem)	50		



Relation with other Modules: -

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	
COURSE DESCRIPTION:	تهتم هذه المادة بتدريس الجرائم الشنيعة التي اقترفها نظام البعث في العراق. فقد جثم نظام البعث البائد على صدر العراق والعراقيين زهاء أربعة عقود يستقي سياسة تسلطه من رِضاع غُثَاة الطغاة حَقَّبَ التاريخ كـ(قائيل، والنمرود، و فرعون، وأبي لهب، والحجاج، ويزيد، وهولاكو وغيرهم) بما يتناسب ونشأة رأسه الطاغية وعدو الانسانية (صدام حسين) المقبور، فذاق ويلات هذا النظام كل من انتهج سبيل الحق وحب الوطن.
Module Aims أهداف المادة الدراسية	١- أن يفهم الطالب مفهوم الجريمة. ٢- أن يتعرف الطالب على أقسام الجريمة وأنواعها. ٣- أن يتعرف الطالب على الجرائم التي ارتكبتها نظام البعث بحق العراق والعراقيين. ٤- أن يتعرف الطالب على انتهاكات حقوق الانسان التي قام بها نظام البعث. ٥- أن يتعرف الطالب على الجرائم النفسية والاجتماعية التي قام بها نظام البعث وآثارها على الشعب العراقي. ٦- أن يتعرف الطالب على الجرائم البيئية التي قام بها نظام البعث وما خلفته من آثار بحق الشعب العراقي. ٧- أن يتعرف الطالب على أحداث جرائم المقابر الجماعية التي قام بها نظام البعث
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١- أن يُعرف الطالب مفهوم الجريمة وفق علم القانون وعلم الاجتماع وعلم النفس ووفق علم الشريعة الاسلامية. ٢- أن يميز الطالب بين أقسام الجرائم وأنواعها. ٣- أن تكون لدى الطالب الرؤية الواضحة والكاملة لحقبة نظام البعث وفي العراق. ٤- اطلاع الطالب على الثورات والانتفاضات التي قام بها الشعب العراقي ضد الحكم وما



	واجهته من قمع وقتل وزج في السجون.
Indicative Contents المحتويات الإرشادية	١ - جرائم نظام البعث في العراق، مقرر دراس للجامعات الحكومية والاهلية كافة. ٢ - قوانين الاحتلال الحربي، حقوق السكان والمدنيين في المناطق المحتلة وحماياتها، الإدارة السياسية، إحسان هندي ٣ - أرشيف مؤسسة السجناء السياسيين. ٤ - أرشيف مؤسسة الشهداء. ٥ - أرشيف المركز العراقي لتوثيق جرائم التطرف في العتبة العباسية المقدسة. ٦ - المسؤولية الدولية عن ارتكاب جريمة الابادة الجماعية، أيمن عبد العزيز سلامة. ٧ - جغرافية أهوار ومستنقعات جنوب العراق، حسن الخياط. ٨ - موسوعة البيئة العراقية، سليم مطر. ٩ - المقابر الجماعية شعب تحت التراب، عباس عطية القرشي.

COURSE SCHEDULE:-

Week	hours	Topics Covered	Learning Outcomes
Topic I			
1		مفهوم الجريمة وأقسامها	1,3
Topic II			
2,3		القرارات الصادرة من المحكمة الجنائية العليا	2, 3,6
Topic III			
4		الجرائم النفسية وآثارها	1,2
Topic IV			
5		الجرائم الاجتماعية وآثارها	4,5
Topic V			
6,7		انتهاكات القوانين العراقية	4,5
Mid-term Exam.			
Topic VI			
8,9		صور انتهاكات حقوق الانسان	4,5
10		الانتهاكات السياسية والعسكرية لنظام البعث	4,5,6
Topic VIII			



11		الجرائم البيئية لنظام البعث في العراق (التلوث الحربي والاشعاعي وانفجار الالغام)	4, 5
12		تدمير المدن والقرى (سياسة الارض المحروقة)، قصف العتبات المقدسة، معركة نهر جاسم	4, 5
13		حرق آبار النفط، تجفيف الاهوار، تجريف البساتين	4, 5
14		جرائم المقابر الجماعية	4, 5
15		التصنيف الزمني لمقابر الإبادة الجماعية في العراق للمدة ١٩٦٣ – ٢٠٠٣م	4,5,6,7
Final Exam			

Learning Outcomes and Assessment Methods

Topics Covered	Learning Outcomes	Strategies for Achieving Outcomes	Assessment Methods
1	1,3	Problem Based Learning, Critical thinking questions.	discussions during lectures
2	2,3,6,7	Theoretical Lectures, tutorials.	discussions during lectures.
3	1,2	Critical thinking questions, Theoretical Lectures, tutorials.	Quizzes, Home works
4	4,5,7	Theoretical Lectures, Small Group Discussions.	Quizzes, Major reports, discussions during lectures, Home works
5	4, 5	Theoretical Lectures, Discussions,	Quizzes, Home works
6	4,5,6,7	Theoretical Lectures, Small Group Discussions.	Quizzes, Home works
7	4,5,6,7	Theoretical Lectures, Discussions.	Quizzes, Home works

Module Evaluation:-

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment (40%)	Quizzes	3	30% (30)	3,7, 10	ALL
	Lab work	4	5% (5)	2,6,9,12	ALL
	Discussions During Lectures	5	5% (5)	Continuous	ALL
Summative assessment	Midterm Exam (10%)	2hr	10% (10)	12	ALL

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(60%)	Final Exam (50%)	3hr	50% (50)	16	ALL
Total assessment			100% (100 Marks)		

توزيع الساعات المجدولة و الغير مجدولة (SWL= SSWL +USWL)

Activity types	Structured SWL	Un structured USWL	No. of weeks	Time Factor	SWL (hr)
Class	78	72	15	2	30
Lab.					
Tutorial					
Self Study		Self Study			
Quizzes		Preparation for the Quizzes	1	2	2
discussions during lectures			6	1	6
Projects / Lab.	Project Work		0	0	0
		Preparation for the Project	0	0	0
Seminar	Presenting a Seminar		2	2	4
		Preparation for the Project			
Assignments, Homework		Preparation for the H.W.	3	1	3
Report		Preparation for the Report			
Midterm Exam (10%)		Preparation for the Exam.	1	1	10
	Evaluation		1	1	1
Final Exam (50%)		Preparation for the Exam.	3	1	3
	Evaluation				
		Total SWL (hr/ Semester)			50
		ECTS			2



"COURSE PORTFOLIO"

Module Information					
معلومات المادة الدراسية					
Module Title	STRENGTH OF MATERIALS			Module Delivery	
Module Type	Basic			☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	QWRE2822				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level		2	Semester		4
Department		Water Resources Engineering	College	College of Engineering	
Module Leader	Mustafa Kareem Hamzah		E-mail	Mustafa.kareem@wrec.uoqasim.edu.iq	
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification		Ph.D.
Module Tutor	Mustafa Kareem Hamzah		e-mail	Mustafa.kareem@wrec.uoqasim.edu.iq	
Peer Reviewer Name		N.A.	e-mail	N.A.	
Scientific Committee Approval Date		01/06/2023	Version Number	1.0	

Student Workload (SWL): Structured SWL (h/w) (Two contact hours of lectures) + Unstructured SWL (h/w) .

Student Workload (SWL)			
الحمل الدراسي للطالب			
Structured SWL (h/sem)	٧٨	Structured SWL (h/w)	5.2
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعياً	
Unstructured SWL (h/sem)	1٢٢	Unstructured SWL (h/w)	8.13
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعياً	
Total SWL (h/sem)	2٠٠		
الحمل الدراسي الكلي للطالب خلال الفصل			



Relation with other Modules:-

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Mechanics	Semester	1,2
Co-requisites module	Theory of Structures	Semester	5

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
COURSE DESCRIPTION:	This course includes the fundamentals of strength of materials, counting discuss the concept of the material characteristics and understand the relationship between stress and strain for specific type of materials. Moreover, study different types of stresses such as normal shear and torsion. Also, analyze different structural members like beam against shear force and bending moment and draw the free body diagram. Correspondingly, introduce the effect of thermal stresses on different materials. The bending stresses will be also discussed for beam and composite sections in addition to compound stresses.
Module Aims أهداف المادة الدراسية	The main objective of this course is to categorize the basic concept of different types of stresses and interior forces. this whitethorn be accomplished by studying stresses and strains of concrete and steel materials. The types of stresses are normal, shear, bending, torsion, thermal and compound stresses. Additionally, familiarize the free body diagram, shear force diagram and bending moment diagram for beam. Another goal of studying this course is identify Moher's circles of stresses and understand the reason behind analyzing materials based on this concept. As a part of structural analysis, the deflection in beams is an important factor that may affect of overall behavior of the structure. Therefore, this course may introduce the concept of deflection in beams.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the completion of the course, students are expected to be able to: - Express the basics of strength of materials. - Draw free body diagram and introduce the internal forces. - Categorize the normal, shear and bending stresses - Describe the concept of strain in materials and its relation with the stresses - Define the effect of temperature on the performance of the materials and structure - Describe the structures that subjected to thermal stresses



	7. Analyze the structure for shear force diagram and bending moment diagram 8. Understand the torsion stresses in materials. 9. Knowledge about composite sections generals and composite circular sections specifically 10. Analyzing the bending stresses in beams and composite sections. 11. Knowledge about shear stresses in beams and bolts 12. Identify the concept of compound stresses 13. Understand the criteria of drawing Mohr's circle of stresses and its impact on overall behavior of the materials and structures. 14. Knowledge about deflection in beams 15. Communicate together and work teams to fulfill engineering objectives (analysis, design, and presentation).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Statics and mechanics of materials by Hibbeler, 2004. 2. Mechanics of Materials (2nd Edition) by Egor P. Popov. 3. Strength of Materials (4th Edition) by Ferdinand L.Singer & Andrew Pytel.

COURSE SCHEDULE: -

Week	hours	Topics Covered	Learning Outcomes
Topic I: Concepts and definitions (Introduction to Strength of Materials)			
1-2	10	- Free body diagram and analysis of internal forces	1, 2, and 15
Topic II: - Stresses and strains in materials			
3-6	20	- Normal stresses - Shear stresses - Bearing stresses - Thermal stresses - Torsion stresses	3,4,5,6 and 15



		- Strain in materials	
Topic III: - Composite sections			
7-8	10	- General composite section - Composite circular section	9,10 and 15
Topic IV: - Shear force, bending moment and bending stresses			
9-11	15	- Shear force diagram - Bending moment diagram - Bending stresses in beams - Bending stresses in composite sections	3, 7, 10 and 15
Topic V: - Shear and compound stresses			
12-13	10	- Shear stresses in beams - Shear stresses in bolts - Compound stresses	11,12 and 15
Topic VI: - Mohr's circle			
14	5	- Mohr's circle for moments - Mohr's circles of stresses	13 and 15
Topic VII: - Deflection			
15	5	- Deflection of beams	14 and 15
Final Exam			

**Learning Outcomes and Assessment Methods for " STRENGTH OF MATERIALS
" Course.**

Topics Covered	Learning	Strategies for Achieving	Assessment Methods
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	Outcomes	Outcomes	
Topic I: Concepts and definitions (Introduction to Strength of Materials)	1, 2, and 15	Report Writing, Field Visits, Theoretical Lectures, Scientific Films, Exploratory Work Teams.	quizzes, Major reports, discussions during lectures, Written Exams, oral exam.
Topic II: - Stresses and strains in materials	3,4,5,6 and 15	Problem Based Learning, Report Writing, Field Visits, Scientific Trips, Theoretical Lectures, Small Group Discussions, Scientific Films, Exploratory Work Teams.	Seminars, Major reports, discussions during lectures. Written Exams, oral exams.
Topic III: - Composite sections	9,10 and 15	Problem Based Learning, Report Writing, Theoretical Lectures, Small Group Discussions, Scientific Films.	Quizzes, discussions during lectures, Written Exams, Home work, oral exams.
Topic IV: - Shear force, bending moment and bending stresses	3, 7, 10 and 15	Report Writing, Scientific Trips. Theoretical Lectures, Small Group Discussions, and Scientific Films.	Seminars, Major reports, discussions during lectures. Written Exams, oral exams.
Topic V: - Shear and compound stresses	11,12 and 15	Theoretical Lectures, Small Group Discussions,	Seminars, quizzes, discussions during lectures, Written Exams, oral exams.
Topic VI: - Mohr's circle	13 and 15	Problem Based Learning, Report Writing, Field Visits, Scientific Trips, Theoretical Lectures, Small Group Discussions, Scientific Films, and, Exploratory Work Teams.	Seminars, quizzes, Major reports, Written Exams, Home work, oral exams.
Topic VII: - Deflection	14 and 15	Problem Based Learning, Theoretical Lectures, Small Group Discussions.	quizzes, discussions during lectures. Written Exams, Home work.

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Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment (40%)	Quizzes	4	10% (10)	3,5, 10, 12	LO #, 3,4,5,8,10 and 11
	Assignments & H.W.	5	10% (10)	2,4,6, 9,11	LO # 1,2,3, 4, 6, 8,10, 12 and 14
	Seminar/ project	1	10% (10)		
	Discussions During Lectures	10	10% (10)	Continuous	ALL
Summative assessment	Midterm Exam (10%)	2 hr	10% (10)	8	LO # 1-10
	Final Exam (50%)	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

توزيع الساعات المجدولة و الغير مجدولة (SWL= SSWL +USWL)



Activity types	Structured SWL	Un structured SWL	No. of weeks	Time Factor	SWL (hr)
Class	Class Lecturers		15	4	60
Lab.					0
Tutorial			15	1	15
Self-Study		Self-Study	15	3	45
Quizzes		Preparation for the Quizzes	4	5	20
discussions during lectures			0	0	0
Projects / Lab.	Project Work		0	0	0
		Preparation for the Project	3	4	12
Seminar	Presenting a Seminar		1	0	0
		Preparation for the Project			0
Assignments, Home Work		Preparation for the H.W.	5	3	15
Report		Preparation for the Report	3	3	9
Midterm Exam (10%)		Preparation for the Exam.	1	10	10
	Evaluation		0	0	0
Final Exam (50%)		Preparation for the Exam.	1	11	11
	Evaluation		1	3	3
		Total SWL (hr/ Semester)			200
		ECTS			8



"COURSE PORTFOLIO"

Module Information معلومات المادة الدراسية			
Module Title	Fluid Mechanics II		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	QWRE2623		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester	4
Department	Water Resources Engineering	College	College of Engineering
Module Leader	Thaer Hashem Rasheed	E-mail	thair.hashim@wrec.uoqasim.edu.iq
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name	N.A.	e-mail	N.A.
Scientific Committee Approval Date		Version Number	1.0

Student Workload (SWL): Structured SWL (h/w) (Two contact hours of lectures+ Two lab hour+ one hour tutorial) + Unstructured SWL (h/w) .

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



Relation with other Modules: -

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

COURSE DESCRIPTION:	This fluid mechanics curriculum provides a comprehensive understanding of fluid behavior and its practical applications. It covers fundamental fluid characteristics, the dynamics of fluid flow in pipes, complexities of pipe networks, open channel flow, and the powerful concepts of similitude and dimensional analysis. Students gain a strong foundation and practical skills in managing fluid systems, making them well-prepared for engineering and scientific applications.
Module Aims أهداف المادة الدراسية	To provide students with a strong foundation in fluid mechanics, enabling them to comprehend, analyze, and manage fluid systems effectively across a broad spectrum of applications
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the completion of the course, students are expected to be able to: 1- provides a foundational understanding of how fluids behave and how this knowledge can be applied in various practical and scientific contexts. 2- equips individuals with the knowledge and skills needed to design, operate, and maintain efficient and reliable fluid transportation systems across various industries. 3- understanding how pipes are arranged in series and parallel networks is fundamental for designing and managing fluid



	transportation systems efficiently and effectively, with applications in a wide range of engineering fields. 4- . learning about flow in open channels equips individuals with the expertise needed to manage water resources, protect against environmental risks, and design infrastructure for efficient and safe fluid transport in open, natural or engineered channels. 5- studying similitude and dimensional analysis equips individuals with powerful tools for model testing, problem-solving, and design in engineering, science, and other fields, fostering more efficient and cost-effective solutions.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1-Fluid Mechanics, Victor L. Streeter& Benjamin Wylie. 2-Fluid Mechanics with Engineering Applications, Robert L. Danpherty, Joseph B. Franzini &E. Johon Finnemor. 3-Fluid Mechanics for Engineers, Maurice L. Albertson, James R. Barton &Darly B. Simon.

COURSE SCHEDULE:-

Week	hours	Topics Covered	Learning Outcomes
Topic1			
16,17,18	6	Characteristics of fluid flow	1
Topic 2			
21,22,23	6	Fluid flow in pipes& friction losses	2
Topic 3			
24,25	4	Pipes in series, pipes in parallel networks	3

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Topic 4			
26,27	4	Flow in open channels	4
Topic 5			
		Similitude and dimensional analysis	5
Topic 6			
28,29,30	6	Review	All
Final Exam			

Learning Outcomes and Assessment Methods

Topics Covered	Learning Outcomes	Strategies for Achieving Outcomes	Assessment Methods
Topic 1:	1	Problem Based Learning, Critical thinking questions, Theoretical Lectures, tutorials, Small Group Discussions,	quizzes, HomeWorks , discussions during lectures reports
Topic 2:	2	Problem Based Learning, Critical thinking questions, Theoretical Lectures, tutorials, Small Group Discussions,	quizzes, HomeWorks, discussions during lectures, Written Exams.
Topic 3:	3	Problem Based Learning, Critical thinking questions, Theoretical Lectures, tutorials, Small Group Discussions,	quizzes, HomeWorks, discussions during lectures, Written Exams.
Topic 4:	4	Problem Based Learning, Critical thinking questions, Theoretical Lectures, tutorials, Small Group Discussions,	quizzes, HomeWorks, discussions during lectures, Written Exams.
Topic 5:	5	Problem Based Learning, Critical thinking questions, Theoretical Lectures, tutorials, Small Group Discussions,	quizzes, HomeWorks, discussions during lectures, Written Exams.
Topic 6:	6	Problem Based Learning, Critical thinking questions, Theoretical	quizzes, HomeWorks, discussions during lectures,

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		Lectures, tutorials, Small Group Discussions,	Written Exams.
Topic 7:	All	Problem Based Learning, Critical thinking questions, Theoretical Lectures, tutorials, Small Group Discussions,	quizzes, HomeWorks, discussions during lectures, Written Exams.

Module Evaluation:-

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment (40%)	Quizzes	٣	30% (30)	٣,٧, 10	ALL
	Assignments & H.W.	4	5% (5)	2,6,9,12	ALL
	Discussions During Lectures	5	5% (5)	Continuous	ALL
Summative assessment (60%)	Midterm Exam (10%)	2hr	10% (10)	12	ALL
	Final Exam (50%)	3hr	50% (50)	16	ALL
Total assessment			100% (100 Marks)		

Activity types	Structured SWL	Un structured USWL	No. of weeks	Time Factor	SWL (hr)
Class	Class Lecturers		15	2	30
Lab.	Lab.		15	2	30
Tutorial	Tutorial		15	1	15
Self Study		Self Study	15	2	30
Quizzes		Preparation for the Quizzes	3	4	12
discussions during lectures			5	1	5
Projects / Lab.	Project Work		0	0	0
		Preparation for the Project	0	0	0
Seminar	Presenting a Seminar		0	0	0
		Preparation for the Project			

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Assignments, Homework		Preparation for the H.W.	4	2	8
Report		Preparation for the Report	0	0	0
Midterm Exam (10%)		Preparation for the Exam.	1	5	5
	Evaluation				
Final Exam (50%)		Preparation for the Exam.	1	12	12
	Evaluation		1	3	3
		Total SWL (hr/ Semester)			150
		ECTS			6

توزيع الساعات المجدولة و الغير مجدولة (SWL= SSWL +USWL)



"COURSE PORTFOLIO"

Module Information			
معلومات المادة الدراسية			
Module Title	Surveying Engineering II		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar
Module Code	QWRE2624		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester	4
Department	Water Resources Engineering	College	College of Engineering
Module Leader	Hayder Abd Al-Razzaq Abd Dibs	E-mail	Dr.hayderdibs@wrec.uoqasim.edu.iq
Module Leader's Acad. Title	Asst. Prof. Dr.	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. MAYTHAM KADHIM OBAID	e-mail	maytham@wrec.uoqasim.edu.iq
Peer Reviewer Name	N.A.	e-mail	N.A.
Scientific Committee Approval Date		Version Number	1.0

Student Workload (SWL): Structured SWL (h/w) (Two contact hours of lectures) + Unstructured SWL (h/w) .

Student Workload (SWL)			
Structured SWL (h/sem)	78	Structured SWL (h/w)	5.2
Unstructured SWL (h/sem)	72	Unstructured SWL (h/w)	4.8
Total SWL (h/sem)	150		



Relation with other Modules: -

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	
COURSE DESCRIPTION:	Introduction to the elements of the discipline of surveying, with concentration on applications for the construction process. Included are topics on: the background and history of the surveying profession and how it interacts with other disciplines; measurement concepts, error consideration, accuracy, precision, and significant figures; methods for distance measuring; elevation measurements and leveling.
Module Aims أهداف المادة الدراسية	1. Identify the principles of surveying engineering 2. Identify the isotopes included within it 3. Identifying surveying devices of all types, electronic and non-electronic, and using them in various engineering projects, especially those related to water resources, their management and monitoring. 4. Learn about the applications of surveying engineering in the field of water resources
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowledge of the principles of engineering surveying 2. Identify the types of engineering surveying 3. Getting to know the different surveying devices 4. Learn about the applications of engineering surveying in projects and research related to water resources 5. Use different surveying devices 6. Learn about surveying techniques and how to use them in serving water resources projects. 7. The possibility of identifying techniques, methods, and surveying devices and harnessing them according to the type of project
Indicative Contents المحتويات الإرشادية	8. Elementary Surveying an Introduction Geomatics By Charles D. Ghilani. Paul R. Wolf/Thirteen Edition 2019 9. Springer Handbook of Geographic Information Kresse, Danko Eds,(Springer-Verlag Berlin Heidelberg 2019) 10. Highway Surveying Manual / Washington State Department of Transportation Environmental and Engineering Service Center 2015 11. BASIC SURVEYING -THEORY AND PRACTICE Ninth Annual Seminar



	Presented by the Oregon Department of Transportation Geometronics Unit Bend, Oregon. 12. Surveying/ Dr A M Chandra Prof. of Civil Engineering NEW AGE Indian Institute of ideology Roorkee ‘ 13. Planning Surveying / Fawzi Al-Khalisi
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COURSE SCHEDULE:-

Week	hours	Topics Covered	Learning Outcomes
Topic I			
1		Introduction - ArcGIS basics: definitions, components, and applications, Basics concepts of the GIS software, principles and methods, database management tools, and elements of maps.	1,3
Topic II			
2,3		GIS projections and coordinate systems, Elements of the Map Scale, Large Scale or Small Scale, Use contrasting symbols to portray geographic differences. GIS projections and coordinate systems, Projections Geographic Reference System: Latitude and Longitude, Cartesian Coordinate System, Map Projections,	2, 3,6
Topic III			
4		Structure and format databases and GIS spatial data models, spatial analysis (vector models).	1,2
Topic IV			
5		Structure and format databases and GIS spatial data models, spatial analysis II, (raster models), vector-based spatial data analysis raster-based spatial data analysis, and buffer analysis.	4,5
Topic V			
6,7		Mid-term Exam. Information and Function, Data inputting in GIS, Database design - editing, and topology creation in GIS.	4,5
Topic VI			



8,9		Information and Function, Data inputting in GIS, Database design - editing, and topology creation in GIS. Relational databases by the linkage between spatial and non-spatial data, Data source; quality, and sources of errors	4,5
10		The linkage between spatial and non-spatial data, Data source; quality, and sources of errors.	4,5,6
Topic VIII			
11		Spatial Data Analysis – Significance and Type, Attribute query, spatial query, reclassifying maps, overlaying maps.	4, 5
12		Spatial Data Analysis – Significance and Type, Attribute Query, Spatial Query: measuring distance and connectivity, Least-Cost Pathway Analyses, characterizing neighborhoods.	4, 5
13		Remote Sensing (RS): definitions, Resolution, Electromagnetic radiation, and the atmosphere, Band spectral response.	4, 5
14		Remote Sensing (RS) – Satellites: Satellite band tradeoffs, Satellite orbits, Landsat versus Sentinel-2, Landsat Thematic Mapper, Landsat 7/8/9 bands, Landsat 8 bands, and Landsat 9 bands.	4, 5
15		Remote Sensing (RS) – Reflectance spectra: Digitizing, Landsat DN computations-radiance, reflectance, brightness temperature, Interpreting sun position, Landsat.	4,5,6.7
Final Exam			

Learning Outcomes and Assessment Methods

Topics Covered	Learning Outcomes	Strategies for Achieving Outcomes	Assessment Methods
1	1,3	Problem Based Learning, Critical thinking questions,	discussions during lectures
2	2,3,6,7	Theoretical Lectures, tutorials,	discussions during lectures.
3	1,2	Critical thinking questions, Theoretical Lectures, tutorials,	Quizzes, Home works
4	4,5,7	Theoretical Lectures, Small Group	Quizzes, Major reports,

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		Discussions,	discussions during lectures, Home works
5	4, 5	Theoretical Lectures, Discussions,	Quizzes, Home works
6	4,5,6,7	Theoretical Lectures, Small Group Discussions,	Quizzes, Home works
7	4,5,6,7	Theoretical Lectures, Discussions,	Quizzes, Home works

Module Evaluation:-

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment (40%)	Quizzes	3	30% (30)	3,7, 10	ALL
	Lab work	4	5% (5)	2,6,9,12	ALL
	Discussions During Lectures	5	5% (5)	Continuous	ALL
Summative assessment (60%)	Mid Exam (10%)	2hr	10% (10)	12	ALL
	Final Exam (50%)	3hr	50% (50)	16	ALL
Total assessment			100% (100 Marks)		

توزيع الساعات المجدولة و الغير مجدولة (SWL= SSWL +USWL)

Activity types	Structured SWL	Un structured USWL	No. of weeks	Time Factor	SWL (hr)
Class	78	72	15	2	30
Lab.			15	2	30
Tutorial			15	1	15
Self-Study		Self Study	15	2	30
Quizzes		Preparation for the Quizzes	1	2	2

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discussions during lectures			6	1	6
Projects / Lab.	Project Work		0	0	0
		Preparation for the Project	0	0	0
Seminar	Presenting a Seminar		2	2	4
		Preparation for the Project			
Assignments, Homework		Preparation for the H.W.	3	1	3
Report		Preparation for the Report	5	3	15
Midterm Exam (10%)		Preparation for the Exam.	1	1	10
	Evaluation		1	1	1
Final Exam (50%)		Preparation for the Exam.	3	1	3
	Evaluation				
		Total SWL (hr/ Semester)			150
		ECTS			6



"COURSE PORTFOLIO"

Module Information						
معلومات المادة الدراسية						
Module Title	Concrete Technology			Module Delivery		
Module Type	Basic			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	QWRE2425					
ECTS Credits	4					
SWL (hr/sem)	100					
Module Level		2	Semester		4	
Department		Water Resources Engineering	College	College of Engineering		
Module Leader		Qusay Sahib Radhi		E-mail	qussai.almurshidi@wrec.uoqasim.edu.iq	
Module Leader's Acad. Title		Assist Professor		Module Leader's Qualification		Ph.D.
Module Tutor		Qusay Sahib Radhi		e-mail	qussai.almurshidi@wrec.uoqasim.edu.iq	
Peer Reviewer Name		N.A.		e-mail	N.A.	
Scientific Committee Approval Date		/ /2023		Version Number	1.0	

Student Workload (SWL): Structured SWL (h/w) (Two contact hours of lectures) + Unstructured SWL (h/w) .

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



Relation with other Modules: -

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

COURSE DESCRIPTION:	study the fundamental of concrete technology including concrete materials, manufacturing, concrete properties in both fresh and hardened state, durability, concrete types and methods of mix design. In addition to make the students able to conduct the different tests through the laboratory work and check the results with the standard specifications.
Module Aims أهداف المادة الدراسية	This course provides a comprehensive treatment of the materials which results in production and construction of high quality concrete for buildings and infrastructure. During the semester, students will practice and learn to characterize and predict the behavior of aggregates, Portland cement and concrete products, also the student will gain experience in designing concrete mixtures.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the completion of the course, students are expected to be able to: 1- Describe the cement, raw materials, manufacturing steps and methods, Cement reaction, Products of cement reaction and Cement tests. 2- Knowledge about aggregate classification, properties and grading curves in addition to the Harmful materials in aggregate. 3- An understanding the fresh state of concrete and factors affecting workability of concrete. 4- Recognize concrete strength (types and affecting factors). 5- List factors affecting durability of Portland cement concrete. 6- An ability to select and design economic mix proportions for different exposure conditions and intended purposes. 7- An ability to identify, formulate and solve cement, aggregate, and concrete problems. Evaluation basic material properties, sizing, strength and durability.



Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1- د. مؤيد نوري خلف ود. هناء عبد يوسف (تكنولوجيا الخرسانة) الجامعة التكنولوجية ١٩٨٤. 2- Neville A.M. & Brooks J.J. (concrete technology) second edition, longman group UK limited 1987. 3- Neville A.M. (Properties of concrete) 5th ed. Harlow, England, London, New York 2011.
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❖ **COURSE SCHEDULE:- (for theory lectures)**

Week	hours	Topics Covered	Learning Outcomes
Topic I: Cement			
1-3	6	Introduction, Manufacturing, chemical composition of cement, Hydration of cement and Cement tests	1
Topic II: Aggregate			
4-6	6	Classification and properties of aggregate, deleterious substances in aggregate and sieve analysis	2
Topic III: Fresh concrete			
7-8	4	Workability and factors affecting workability, Segregation, bleeding and mixing of concrete	3,7
Topic IV: Hardened concrete			
9-10	4	Concrete strength, types of concrete strength and factors affecting strength.	4,7
Topic V: Concrete durability			
11-13	6	Concrete permeability, sulfate and acid attack, effect of sea water and factors affecting durability	5,7
Topic VI: Design of concrete mixtures			

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14-15	4	<i>Design of concrete mixture, UK and US method.</i>	6
<i>Final Exam</i>			

❖ **COURSE SCHEDULE:- (for experimental work)**

Week	hours	Topics Covered	Learning Outcomes
1	2	<i>Introduction: lab safety, how to write report and using balances.</i>	1
2	2	<i>Standard consistency test for cement</i>	1
3	2	<i>Initial and final setting time for cement</i>	1
4	2	<i>Soundness of cement</i>	1
5	2	<i>Fineness of cement</i>	1
6	2	<i>Compressive strength of cement</i>	1
7	2	<i>Aggregate sampling</i>	2
8	2	<i>Sieve analysis for Fine aggregate</i>	2
9	2	<i>Sieve analysis for coarse aggregate</i>	2
10	2	<i>Slump test</i>	3
11	2	<i>Compacting factor test</i>	3
12	2	<i>Compressive strength test</i>	4
13	2	<i>Splitting tensile strength test</i>	4
14	2	<i>Flexural strength test</i>	4

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15	2	<i>Non-destructive tests : ultrasonic pulse velocity test</i>	7
<i>Final Exam</i>			

Learning Outcomes and Assessment Methods

Topics Covered	Learning Outcomes	Strategies for Achieving Outcomes	Assessment Methods
<i>Topic I: Cement</i>	1	Report Writing, Theoretical Lectures, Scientific, laboratory tests, Problem Based Learning, Critical thinking questions, Small Group Discussions.	quizzes, Major reports, discussions during lectures, Written Exams, oral exams.
<i>Topic II: Aggregate</i>	2	Report Writing, Theoretical Lectures, Scientific, laboratory tests, Problem Based Learning, Critical thinking questions, Small Group Discussions.	Seminars, Major reports, discussions during lectures. Written Exams, oral exams.
<i>Topic III: Fresh concrete</i>	3,7	Report Writing, Theoretical Lectures, Scientific, laboratory tests, Problem Based Learning, Critical thinking questions, Small Group Discussions.	Discussions during lectures, Written Exams, Home work, oral exams.
<i>Topic IV: Hardened concrete</i>	4,7	Report Writing, Theoretical Lectures, Scientific, laboratory tests, Problem Based Learning, Critical thinking questions, Small Group Discussions.	Major reports, quizzes, discussions during lectures. Written Exams, oral exams.
<i>Topic V: Concrete durability</i>	5,7	Report Writing, Theoretical Lectures, Scientific, laboratory tests, Problem Based Learning, Critical thinking questions, Small Group Discussions.	Seminars , discussions during lectures, Written Exams, oral exams.
<i>Topic VI: Design of concrete mixtures</i>	6	Report Writing, Theoretical Lectures, Scientific, laboratory tests, Problem Based Learning, Small Group Discussions.	quizzes, Major reports, Written Exams, Home work, oral exams.

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Module Evaluation:-

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment (40%)	Quizzes	3	10% (10)	3,10,14	ALL
	Assignments & H.W.	2	5% (5)	7,15	ALL
	Projects / Lab.	1	10% (10)	Continuous	ALL
	Seminar	2	5% (5)	5,12	ALL
	Discussions During Lectures	5	10% (10)	Continuous	ALL
Summative assessment (60%)	Midterm Exam (10%)	2hr	10% (10)	8	ALL
	Final Exam (50%)	3hr	50% (50)	16	ALL
Total assessment			100% (100 Marks)		

توزيع الساعات المجدولة و الغير مجدولة (SWL= SSWL +USWL)

Activity types	Structured SWL	Un structured USWL	No. of weeks	Time Factor	SWL (hr)
Class	Class Lecturers		15	2	30
Lab.			15	2	30
Tutorial					
Self Study		Self Study	15	1	15
Quizzes		Preparation for the Quizzes	3	1	3
discussions during lectures			0	0	0
Projects / Lab.	Project Work		0	0	0
		Preparation for the Project			
Seminar	Presenting a Seminar		0	0	0
		Preparation for the Project	2	1	2
Assignments, Homework		Preparation for the H.W.	2	1	2
Report		Preparation for the Report	0	0	0

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Midterm Exam (10%)		Preparation for the Exam.	1	5	5
	Evaluation		0	0	0
Final Exam (50%)		Preparation for the Exam.	1	10	10
	Evaluation		1	3	3
		Total SWL (hr/ Semester)			100
		ECTS			4



"COURSE PORTFOLIO"

Module Information					
معلومات المادة الدراسية					
Module Title	Construction and Building Materials			Module Delivery	
Module Type	Basic			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	QWRE2426				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level			2		
Department		Water Resources Engineering	College	College of Engineering	
Module Leader	Tholfekar Habeeb Hussain		E-mail	htholfekar@wrec.uoqasim.edu.iq	
Module Leader's Acad. Title		Assist Professor	Module Leader's Qualification		MS.C.
Module Tutor	Tholfekar Habeeb Hussain		e-mail	htholfekar@wrec.uoqasim.edu.iq	
Peer Reviewer Name		N.A.	e-mail	N.A.	
Scientific Committee Approval Date		1 /6 /2023	Version Number	1.0	

Student Workload (SWL): Structured SWL (h/w) (Two contact hours of lectures) + Unstructured SWL (h/w) .

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



Relation with other Modules: -

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

COURSE DESCRIPTION:	Explain the development of construction materials and methods of construction , and the expected problems that may occur during and after the project execution with brief idea about the solutions.
Module Aims أهداف المادة الدراسية	The main objective is to make the student have an ability to explain , discover , and thinking about the construction details so as to reach to the goal of select , compare , and choose the suitable materials and the better method for construction.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the completion of the course, students are expected to be able to: 1- Knowing the different construction materials and different construction methods. 2- Discover and recognize the problems and specify the problem statement. 3- Compare between the construction materials and methods for different requirements. 4- Choose and select the suitable solution for any usage and problems. 5- Knowing and have an experiences on using the specifications and standards codes in engineering works.
Indicative Contents المحتويات الإرشادية	انشاء المباني- زهير ساكو وارتين ليفون المواد الانشائية – جلال بشير سرسم

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❖ COURSE SCHEDULE:- (for theory lectures)

Week	hours	Topics Covered	Learning Outcomes
1	2	Clay Bricks , properties of Clay Bricks ,Manufacture of Clay Bricks ,	1
2	2	Types of clay Bricks, Stabilized Soil brick ,Refractory Bricks , Glazed Bricks	1
3	2	Sand - Lime Bricks ,Glass bricks ,Concrete Bricks , Cellular blocks	1
4	2	Binding Materials Gypsum (properties and Types)	2
5	2	Lime (types), Wood	2
6	2	Tiles (Types ,Properties), Granite , Marble	2
7	2	Ceramic , Porcelain	3
8	2	Masonry stone (Types ,Properties)	3
9	2	Introduction , Building construction stages , Types of buildings, building construction evolution	4
10	2	Excavation and earth filling, types of mechanic excavation apparatus, ground water discharge	4
11	2	Foundation, introduction, deep of foundations,	4,5
12	2	Foundation settlement, vibrations and foundations	4,5
13	2	Piles works, types of piles	5
14	2	Forms and scaffoldings, Types	5
15	2	Floors and Roofs ,Types of loads	5

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Learning Outcomes and Assessment Methods

Topics Covered	Learning Outcomes	Strategies for Achieving Outcomes	Assessment Methods
Topic I: building materials, bricks	1	Report Writing, Theoretical Lectures , laboratory tests, Problem Based Learning.	quizzes, Major reports, discussions during lectures, Written Exams.
Topic II: Types of Bricks, Binding materials	2	Report Writing, Theoretical Lectures , laboratory tests, Problem Based Learning.	quizzes, Major reports, discussions during lectures, Written Exams.
Topic III: Different Buildings Material	3	Report Writing, Theoretical Lectures , laboratory tests, Problem Based Learning.	quizzes, Major reports, discussions during lectures, Written Exams.
Topic IV: Types of buildings ,Earthworks	4	Report Writing, Theoretical Lectures , laboratory tests, Problem Based Learning.	quizzes, Major reports, discussions during lectures, Written Exams.
Topic V: Foundations	4, 5	Report Writing, Theoretical Lectures , laboratory tests, Problem Based Learning.	quizzes, Major reports, discussions during lectures, Written Exams.
Topic VI: Forms and scaffoldings	5	Report Writing, Theoretical Lectures , laboratory tests, Problem Based Learning.	quizzes, Major reports, discussions during lectures, Written Exams.

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Module Evaluation:-

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment (40%)	Quizzes	١	10% (10)	3	ALL
	Assignments & H.W.	١	١٠% (١٠)	7	ALL
	Projects / Lab.	1	10% (10)	Continuous	ALL
	Discussions During Lectures	1	10% (10)	Continuous	ALL
Summative assessment (60%)	Midterm Exam (10%)	2hr	10% (10)	8	ALL
	Final Exam (50%)	3hr	50% (50)	16	ALL
Total assessment			100% (100 Marks)		

توزيع الساعات المجدولة و الغير مجدولة (SWL= SSWL +USWL)

Activity types	Structured SWL	Un structured USWL	No. of weeks	Time Factor	SWL (hr)
Class	Class Lecturers		15	2	30
Lab.			15	2	30
Tutorial					
Self Study		Self Study	10	1	10
Quizzes		Preparation for the Quizzes	3	2	6
discussions during lectures			1	4	4
Projects / Lab.	Project Work		0	0	0
		Preparation for the Project			
Seminar	Presenting a Seminar		0	0	0
		Preparation for the Project	0	0	0
Assignments, Homework		Preparation for the H.W.	2	1	2
Report		Preparation for the Report	0	0	0
Midterm Exam (10%)		Preparation for the Exam.	1	5	5
	Evaluation		1	2	2
Final Exam (50%)		Preparation for the Exam.	1	8	8
	Evaluation		1	3	3
Total SWL (hr/ Semester)					100

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		ECTS	4
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"COURSE PORTFOLIO"

Module Information			
معلومات المادة الدراسية			
Module Title	English Technical writing		Module Delivery
Module Type	Support		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	QWRE1227		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	Semester	4
Department	Water Resources Engineering	College	College of Engineering
Module Leader	Khadija Abd Mohammed	E-mail	Khadeja@wrec.uoqasim.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Qualification	Leader's Asst. Lect.
Module Tutor	Khadija Abd Mohammed	e-mail	Khadeja@wrec.uoqasim.edu.iq
Peer Reviewer Name	N.A.	e-mail	N.A.
Scientific Committee Approval Date	13/10/2023	Version Number	1.0

Student Workload (SWL): Structured SWL (h/w) (Two contact hours of lectures) + Unstructured SWL (h/w) .

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



Relation with other Modules: -

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

COURSE DESCRIPTION:	This course is devoted to develop and improve students' writing skills by choosing topics that are related to academic writing. In addition, this course highlights the correct formation of sentences to avoid spelling and grammatical errors that affect the general meaning. One other side, this course supports students to develop academic writing abilities which considered the key to building their confidence to practice what they learn.
Module Aims أهداف المادة الدراسية	In this course, the student will learn: 1- The accuracy and clarity in writing . 2- Attract attention to words by using linguistic devices. 3- Fill their writing with silent attention as well as giving emphasis to certain parts of the sentence by using the Punctuation marks 4- Using simple sentence structures to clarify scientific writing as well as active voice to make sentences as short and straightforward as possible. 5- The distinguish between the content and function words help the students in understanding, and, most important in pronunciation skills because finding out (the content words and function words) will help students to convey the meaning more effectively and create a strong impact on their audience.



Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the completion of the course, students are expected to be able to: 1. Identify the content words and function words. 2. Improving the pronunciation. 3. Write sentences semantically and grammatically correct. 4. Understanding the types of sentences. 5. Reduce repetition and add emphasis to important points in the text. 6. Express their thought and ideas clearly while writing. 7. Adding more detail or information to a sentence. 8. Helping the reader to clearly understand the message that is being conveyed. 9. Showing the importance of specific words. 10. Identify the words that should be capitalized. 11. Avoid sudden shifts in writing. 12. Write only what needs to be written. 13. Write effectively and powerfully. 14. Creating a complex sentence.
Indicative Contents المحتويات الإرشادية	1. Biber, D., Jahansson, S., Leech, G., Conrad, S., & Edward, F. (1999). Longman Grammar of Spoken and Written English. Pearson Education Limited. 2. Seaton, A. (2007). Basic English Grammar for English Language Learners. Saddleback Educational Publishing. 3. American Psychological Association. (2010). Publication Manual of American Psychological Association. Library of Congress Cataloging-in-Publication Data.

COURSE SCHEDULE:-

Week	Topics Covered	Learning Outcomes	Notes
1	Capitalization	9	
2	Content Words	1,2,3	
3	Function Words	1,2,3	
4	Types of Phrases.	7	



5	Types of Sentences	4,5,6	
6	Types of Sentences	4,5,6	
7	Subordinate Conjunctions.	14	
8	Exam		
9	The Mechanics of Style .	8,9	
10	The Mechanics of Style	8,9	
11	Smoothness of Expression	11	
12	Economy of Expression	12	
13	Linguistic Devices.	13	
14	Strategies to Improve Writing Style.	8,9,11,12	
15	Strategies to Improve Writing Style.	8,9,11,12	

Learning Outcomes and Assessment Methods

Topics Covered	Learning Outcomes	Strategies for Achieving Outcomes	Assessment Methods
Capitalization	9	Theoretical Lectures	quizzes, discussions during lectures
Content Words	1,2,3	Theoretical Lectures	quizzes, discussions during lectures
Function Words	1,2,3	Theoretical Lectures	quizzes, discussions during lectures
Types of Phrases.	7	Theoretical Lectures	quizzes, discussions during lectures

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Types of sentences	4,5,6	Theoretical Lectures	quizzes, discussions during lectures
Types of sentences	4,5,6	Theoretical Lectures	quizzes, discussions during lectures
Subordinate Conjunctions	14	Theoretical Lectures	quizzes, discussions during lectures
Exam			
The Mechanics of Style	8,9	Theoretical Lectures	quizzes, discussions during lectures
The Mechanics of Style	8,9	Theoretical Lectures	quizzes, discussions during lectures
Smoothness of Expression	11	Theoretical Lectures	quizzes, discussions during lectures
Economy of Expression	12	Theoretical Lectures	quizzes, discussions during lectures
Linguistic Devices	13	Theoretical Lectures	quizzes, discussions during lectures
Strategies to Improve Writing Style	8,9,11,12	Theoretical Lectures	quizzes, discussions during lectures
Strategies to Improve Writing Style	8,9,11,12	Theoretical Lectures	quizzes, discussions during lectures

Exam

Module Evaluation:-



Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment (40%)	Quizzes	٢	20% (20)	٣,٧, 10	ALL
	Assignments & H.W.	6	5% (10)	2,6,9,12	ALL
	Discussions During Lectures	5	5% (10)	Continuous	ALL
Summative assessment (60%)	Midterm Exam (10%)	2hr	10% (10)	12	ALL
	Final Exam (50%)	3hr	50% (50)	16	ALL
Total assessment			100% (100 Marks)		

توزيع الساعات المجدولة و الغير مجدولة (SWL= SSWL +USWL)

Activity types	Structured SWL	Un structured USWL	No. of weeks	Time Factor	SWL (hr)
Class	Class Lecturers		15	2	30
Lab.					
Tutorial					
Self Study		Self Study	10	1	10
Quizzes		Preparation for the Quizzes	2	3	6
discussions during lectures			6	1	6
Projects / Lab.	Project Work		6	1	6
		Preparation for the Project	2	1	2
Seminar	Presenting a Seminar		1	4	4
		Preparation for the Project	0	0	
Assignments, Homework		Preparation for the H.W.	1	8	8
Report		Preparation for the Report	1	3	3
Midterm Exam (10%)		Preparation for the Exam.			
	Evaluation				
Final Exam (50%)		Preparation for the Exam.	10	1	10
	Evaluation		1	3	3

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		Total SWL (hr/ Semester)	50
		ECTS	2