

وزارة التعليم العالي والبحث العلمي
جهاز الإشراف والتقييم العلمي
دائرة ضمان الجودة والاعتماد الأكاديمي

استمارة وصف البرنامج الأكاديمي للكليات والمعاهد
للعام الدراسي 2023-2024

الجامعة : ذي قار

الكلية/المعهد: كلية الهندسة

القسم العلمي :- قسم الهندسة المدنية

تاريخ ملء الملف : 2024/3/20



التوقيع :

اسم المعاون العلمي : أ.د. مشتاق أسماعيل الابراهيمى

التاريخ : ٢٠٢٤/٣/٢٠



التوقيع :

اسم رئيس القسم : أ.م.د. جواد كاظم ثجيل

التاريخ

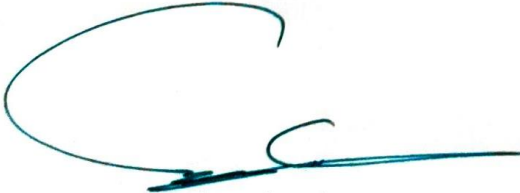
دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي:

التاريخ :- 31/3/2024

التوقيع:-



مصادقة السيد العميد





Ministry of Higher Education and Scientific Research
University of Thi-Qar
College of Engineering
Civil Engineering Department



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	ENGINEERING STATISTICS		Module Delivery
Module Type	CORE		Theory Lecture Tutorial
Module Code	CE103		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGI	Semester of Delivery	
Administering Department		College	
Module Leader	Dr. Kasim Alomari	e-mail	alomari.kasim@utq.edu.iq
Module Leader's Acad. Title	Asst. Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name	Asst. Prof. Dr. Jawad K. Thajeel	e-mail	Jawad.thajeel@utq.edu.iq
Review Committee Approval		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	<ol style="list-style-type: none"> 1. Develop a foundation in statistical concepts and techniques applicable to civil engineering. 2. Understand the importance of data collection, analysis, and interpretation in engineering decision-making. 3. Apply statistical methods to solve engineering problems and make informed decisions. 4. Develop critical thinking and problem-solving skills through the application of statistical techniques. 5. Enhance quantitative reasoning skills and the ability to analyze and interpret engineering data. 6. Communicate statistical analysis results effectively through written and oral presentations. 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. By learning statistics, civil engineering students can develop skills in analyzing and interpreting data. 2. Statistics helps civil engineers understand and quantify uncertainties associated with engineering systems. 3. Knowledge of statistics enables civil engineers to design and conduct experiments effectively. They learn how to formulate hypotheses, collect data, and apply statistical tests to evaluate the significance of results. 4. Civil engineering students can learn regression analysis techniques to develop mathematical models that describe the behavior of complex systems, such as structural responses, traffic flow patterns, or environmental phenomena. 5. Learning statistics enhances the overall analytical and problem-solving skills of civil engineering students. 		
Indicative Contents المحتويات الإرشادية	<ol style="list-style-type: none"> 1. Introduction to Engineering Statistics <ul style="list-style-type: none"> • Importance of statistics in civil engineering • Basic statistical concepts and terminology • Overview of statistical methods used in engineering analysis. 2. Descriptive Statistics <ul style="list-style-type: none"> • Measures of central tendency (mean, median, mode) • Measures of dispersion (range, variance, standard deviation) • Frequency distributions and histograms • Graphical representation of data (scatter plots, box plots) 3. Probability Theory <ul style="list-style-type: none"> • Basic concepts of probability • Probability distributions (uniform, normal, exponential) • Probability calculations and rules (addition, multiplication, conditional probability) 		

	<ul style="list-style-type: none"> • Applications of probability in civil engineering (e.g., reliability analysis) <ol style="list-style-type: none"> 4. Sampling and Data Collection <ul style="list-style-type: none"> • Types of sampling methods (random, stratified, cluster) • Sample size determination • Data collection techniques (surveys, experiments, observations) 5. Statistical Inference <ul style="list-style-type: none"> • Estimation of population parameters (point estimation, confidence intervals) • Hypothesis testing (null and alternative hypotheses, p-values, significance level) • Common statistical tests (t-tests, chi-square tests) • Interpreting and communicating statistical results. 6. Regression Analysis <ul style="list-style-type: none"> • Simple linear regression 7. Conclusion and Review <ul style="list-style-type: none"> • Recap of key concepts and techniques covered in the course. • Integration of statistical analysis in civil engineering practice • Encouragement for further exploration and application of statistics in future studies and projects
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<ol style="list-style-type: none"> 1. Active Learning: Encourage active participation and engagement of students through various activities such as group discussions and problem-solving exercises. This promotes a deeper understanding of statistical concepts and their practical applications. 2. Real-world Examples: Incorporate real-world examples and case studies from civil engineering projects to illustrate how statistics is applied in practice. This helps students connect statistical concepts with their potential applications in engineering scenarios. 3. Visualization Techniques: Use visual aids, such as charts, graphs, and diagrams, to help students visualize statistical data and concepts. Visual representations can enhance understanding and interpretation of statistical information. 4. Practical Application: Provide opportunities for students to apply statistical techniques to solve engineering problems. Assign projects or exercises that involve data collection, analysis, and interpretation, allowing students to experience the relevance of statistics in engineering decision-making.
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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 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	4	20% (20)	4, 8, 12	1 - 5
	HWs	7	20% (20)	3,4,5,7,8,9,11,13	1 - 5
Summative assessment	Midterm Exam	2 hr	10% (10)	7	1 - 3
	Final Exam	2hr	50% (50)	16	1 - 5
Total assessment			100% (100)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Course Introduction + Types of Statistics
Week 2	Variables + Types of Data
Week 3	Frequency Distribution
Week 4	Measure of Central Tendency
Week 5	Measures of Dispersion
Week 6	Confidence Intervals
Week 7	Mid-term Exam + Probability Theory
Week 8	Probability Theory
Week 9	Probability Theory
Week 10	Probability Theory
Week 11	Special Distributions
Week 12	Special Distributions
Week 13	Regression and Correlation
Week 14	Regression and Correlation

Week 15	Course wrap-up and review
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	None	NA
Recommended Texts	1. Montgomery, D. C., Runger, G. C., & Hubele, N. F. (2017). Engineering Statistics. John Wiley & Sons. 2. Navidi, W. (2014). Statistics for Engineers and Scientists. McGraw-Hill Education.	NA
Websites	1. OpenIntro Statistics: This free online textbook provides a comprehensive introduction to statistics, covering topics such as probability, hypothesis testing, regression analysis, and more. Access it at: https://www.openintro.org/stat/ 2. Khan Academy: Khan Academy offers a wide range of video lessons and practice exercises on statistics and probability. Topics covered include descriptive statistics, probability, hypothesis testing, and regression analysis. Visit: https://www.khanacademy.org/math/statistics-probability	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.



Ministry of Higher Education and
Scientific Research - Iraq
University of Thi-Qar
College of Engineering
Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	ENGINEERING MECHANICS-DYNAMICS		Module Delivery	
Module Type	CORE		Theory Lecture Lab Tutorial Practical Seminar	
Module Code	CE102			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	1	Semester of Delivery		2
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Dr. Khaldon Kasim Aswed		e-mail	Khaldoon-qasim@utq.edu.iq
Module Leader's Acad. Title	Lecturer7	Module Leader's Qualification	Ph.D.	
Module Tutor	Shifaa Nazeel		e-mail	None
Peer Reviewer Name	Dr. Ghanim Mohammed Kamil		e-mail	ghanim.kamil@utq.edu.iq
Review Committee Approval	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	<ol style="list-style-type: none"> 1. To understand the fundamentals of friction and assess stability or movement state based on friction and static conditions. 2. To study and apply the relationships of rectilinear and curvilinear motions of particles. 3. To study and apply equations and basic concepts of rigid bodies motion. 4. To study the work exerted due to the application of forces as well as the transformations of energy involved when the motion commences as a result of these forces. 5. To study the impulse and momentum caused by accelerately moving masses. 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Applying friction and static equations to solve impending motion problems 2. Ability to model and analyze systems under the effect of friction . 3. Ability to solve rectilinear motion problems. 4. Applying the fundamentals of angular motion of lines 5. Solving problems involving curvilinear motion of a particle. 6. Recognizing the mathematical representation of the projectile path. 7. Correctly applying equations of particle relative motion and line angular motion equations. 8. Ability to solve problems of rectilinear translation and rotation of rigid bodies. 9. Ability to calculate the work exerted by forces and to apply conservation of energy law for moving bodies. 10. Formulate and determine Linear Impulse and Linear Momentum in terms of force, mass and acceleration. 		
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p><u>Friction</u> Definition, Basic Concept, Types of friction Essential equations of static and kinetic friction situations Friction Problems:</p> <ul style="list-style-type: none"> • Impending motion problems • Analysis of force Systems under the effect of friction <p style="text-align: right;">..... [18 hrs]</p>		

	<p><u>Rectilinear Motion</u> Relationships between Position, Velocity and Acceleration for a rectilinearly moving particle. Determination of distance, displacement, average velocity and average speed. Motion at constant acceleration: Equations with the applications to determine position and velocity [12 hrs]</p> <p><u>Angular Motion of Lines</u> Equations and applications [3 hrs]</p> <p><u>Curvilinear motion of a particle</u> Equations and applications [3 hrs]</p> <p><u>Motion of projectiles</u> Mathematical representation of the path coordinates at any time by parametric equations, with solved problems [6 hrs]</p> <p><u>Relative motion of a particle</u> Relative motion, definition and applications. Relative displacement, relative velocity and relative acceleration Relative angular motion of a line [6 hrs]</p> <p><u>Motion of rigid bodies</u> Rectilinear translation of a rigid body: equations and application. Rotation of a rigid body : equations and application [6 hrs]</p> <p><u>Work and Energy</u> Work exerted by a force Types of Energy involved in motion (relationships and calculation) <ul style="list-style-type: none"> • Thermal energy • Mechanical energy (Potential energy and kinetic energy • Internal energy • Conversation of energy law, Motion problems involving work and different types of energy [18 hrs] </p> <p><u>Linear Impulse and Linear Momentum</u> Relationship with mass, force and acceleration Determination of impulse and momentum of moving rigid bodies [12 hrs]</p>
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The following strategies will be adopted in delivering this module: <ul style="list-style-type: none"> • Starting with the most simplified level information then gradually

	<p>building up to the required level.</p> <ul style="list-style-type: none"> Encouraging the students to participate 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 the assignments handed to the students.
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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		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (10)	6, 13	LO #1-3, 7-9
	Assignments	2	10% (10)	4, 9	LO # 1-7
	Participation	1	10% (10)	Continuous	
Summative assessment	Midterm Exam	1.5 hr	10% (10)	10	LO # 1-8
	Final Exam	3 hrs	50% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Friction: Definition, theory of dry friction, Static friction and Kinetic friction, Static frictional resistance, angle of friction, Characteristics of dry friction
Week 2	Sliding and Tipping over friction problems, Impending motion problems
Week 3	Analysis of force Systems under the effect of friction
Week 4	Rectilinear Motion : Position, Velocity and Acceleration Relationships

Week 5	Equations of Motion at constant acceleration or under the gravity acceleration
Week 6	Angular motion of line, Curvilinear motion of a particle using rectangular components
Week 7	Motion of projectiles, Parametric equations of the path
Week 8	Relative motion of a particle: definition, Relative angular motion of a line, Relative displacement, relative velocity and relative acceleration
Week 9	Motion of rigid bodies: Rectilinear translation of a rigid body, Rotation of rigid body
Week 10	Work and Energy, Work exerted by a force, Energy involved in motion, thermal energy,
Week 11	Mechanical energy : Potential energy and kinetic energy, Internal energy
Week 12	Application of Conservation of energy law for moving bodies.
Week 13	Linear Impulse and Linear Momentum: Relationship with mass, force and acceleration
Week 14	Determination of impulse and momentum of moving rigid bodies
Week 15	Preparatory Week
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) N/A 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	Engineering Mechanics Statics and Dynamics. Archie Higdon and William B. Stiles, Prentice-Hall International	Yes

Recommended Texts	Engineering mechanics. Static, R. C. Hibbeler, Pearson Prentice Hall.	No
Websites		

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.





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MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	ENGINEERING MECHANICS-STATICS		Module Delivery	
Module Type	CORE		Theory Lecture Lab Tutorial Practical Seminar	
Module Code	CE101			
ECTS Credits	8			
SWL (hr/sem)	200			
Module Level	1	Semester of Delivery		1
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Dr. Khaldon Kasim Aswed		e-mail	Khaldoon-qasim@utq.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Shifaa Nazeel		e-mail	None
Peer Reviewer Name	Dr. Ghanim Mohammed Kamil		e-mail	ghanim.kamil@utq.edu.iq
Review Committee Approval	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	<ol style="list-style-type: none"> 1. To clearly distinguish between scalar and vector quantities and understand the idea and definition of force as a vector quantity. 2. To understand the idea of couple or moments as a result of force acting perpendicular to a distance. 3. To understand the different types of force-moment systems that can affect rigid bodies and how to summate the forces in each system type. 4. To understand the conditions of equilibrium state for rigid bodies under the various force systems. 5. To learn how to apply the equilibrium conditions to solve simple structures such as beams, frames and trusses and analyzing internal forces in beams when they are acted on by external forces. 6. To learn how to find centroids, center of gravity and moments of inertia of bodies and areas. 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Recognizing force and moment as vector quantities, their units in both SI and American systems. 2. Listing the different types of force-moment system and finding the resultant of each system type. 3. Analyze forces into their components (Rectangular or Non-Rectangular components, In-plane or in-space types of components). 4. Identify the basic types of supports and reaction components of each type. 5. Draw the free-body diagrams of structures under equilibrium. 6. Ability to use equilibrium equations to analyze beams. 7. Applying equilibrium conditions to analyze simple frames. 8. Ability to solve pulley systems by equilibrium equations. 9. Analyzing trusses by methods of joints and sections. 10. Locating the centroid coordinates of different areas. 11. Finding the moments of inertia of various areas and volumes. 		
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Fundamental concepts and units of measurement</u> Definitions, Systems of units and Conversions Scalar and vector quantities, examples, difference in operations Force, definition, representation		

	<p>Couple and moments, representation, sign convention..... [8 hrs]</p> <p><u>Forces and Moments in plane</u> Force composition and Reduction in plane Resolving forces in plane Types of Coplanar force systems Determination of Resultant in various types of coplanar force systems.... [16 hrs]</p> <p><u>Forces and Moments in space</u> Force composition and Reduction in space Resolving forces in space Determination of Resultant in space..... [8 hrs]</p> <p><u>Equilibrium</u> Types of supports and their reaction components Free body diagram Equations of equilibrium Application of equilibrium equations on simple structures....., [16 hrs]</p> <p><u>Analysis of Cables and Pulleys</u> [4 hrs]</p> <p><u>Analysis of Frames</u> Frames with rigid joints Frames with rigid joints and smooth pins..... [12 hrs]</p> <p><u>Analysis of Trusses</u> Features of truss structures, members, joints and loading style Truss analysis using method of joints Truss analysis using method of sections [16 hrs]</p> <p><u>Centroid of Areas</u> Centroids of Regular shapes Centroids of Composite shapes Areas with various curved boundaries [16 hrs]</p> <p><u>Moments of Inertia</u> Determination of moment of inertia for regular shapes Determination of moment of inertia for composite shapes Polar moment of Inertia, Radius of gyration Products of Inertia Moment of Inertia Transformations [16 hrs]</p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>The following strategies will be adopted in delivering this module:</p> <ul style="list-style-type: none"> Starting with the most simplified level information then gradually building up to the required level.

	<ul style="list-style-type: none"> Referring is always utilized to real bodies and structures that can help students understand how these structures are subjected to loads and the way these resist the loads. Encouraging the students to participate 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 the assignments handed to the students.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	123	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (10)	5, 9	LO #1-8
	Assignments	2	10% (10)	5, 13	LO # 1-3, 9-10
	Participation	1	10% (10)	Continuous	
Summative assessment	Midterm Exam	1.5 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hrs	50% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction – Fundamental concepts, Unit systems, forces and Moments
Week 2	Analysis of forces in plane, rectangular components, Non-rectangular components
Week 3	Resultant of various types of coplanar force systems

Week 4	Force analysis in space- Resultant of force-moment systems in space
Week 5	Hinges, rollers and other types of supports and their reaction components- Free body diagrams
Week 6	Equilibrium: definition, equilibrium equations, application to simple structures
Week 7	Cables and Pulleys: Analysis using free body diagrams and equilibrium conditions, Frames with rigid joints, Frames with rigid joints and smooth pins
Week 8	Frame Analysis using free body diagrams and equilibrium principles
Week 9	Truss structures, Truss analysis using method of joints
Week 10	Truss analysis using method of sections
Week 11	Centroid definitions and mathematical relationships, centroid of regular shapes, centroid of composite shapes
Week 12	Centroid of Areas with curved boundaries
Week 13	Moment of inertia: Fundamental concepts and mathematical models, regular shapes and composite shapes
Week 14	Polar moment of inertia, Product of inertia , moment of inertia transformations (Mohr Circle)
Week 15	Preparatory Week
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) N/A 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	Engineering Mechanics Statics and Dynamics. Archie Higdon and William B. Stiles, Prentice-Hall International	Yes
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Websites		

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Note:				
<p>NB 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.</p>				





Ministry of Higher Education and
Scientific Research - Iraq
University of Thi-Qar
College of Engineering
Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	APPLIED CHEMISTRY		Module Delivery
Module Type	BASIC		Theory Lecture Practical Seminar
Module Code	ER101		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery	
Administering Department	Civil Engineering	College	Engineering
Module Leader	Dr. Saleem Ethaib Mohammad	e-mail	dr.saleem@utq.edu.iq
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name		e-mail	
Review Committee Approval	X/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	<ol style="list-style-type: none"> 1. To understand the chemical interaction with natural environment (atmosphere and solutions) and the reaction of building materials with the environment (corrosion of metals, durability). 2. To understand the chemical processes involved, the clearer we can target at influencing them, and the better and the more durable the results will be. 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Discuss how engineering involves chemistry 2. Summarize Chemistry applications in Building Materials (Examples) 3. Identify the structure of materials. The concept and structure of matter 4. Recognize Cement chemistry. its manufacture, reaction with water and setting to form a solid used in almost all structures. 5. Discuss how to produce cement limestone and clay and to react at high temperatures. The individual elements Ca, Si, O, Al, Fe rearrange themselves to form reactive cement. When mixed with water this cement will harden to become hydrated or hardened cement. 6. Identify the Chemical Composition of Cement 7. Identify burning process : chemical reactions in rotary Klin Zones 8. Discuss the sequence of changes during setting and hardening 9. Identify Setting and Hardening : Chemical Reactions 10. Discuss the Classification of Cements 11. Identify the Green cement and its different types. 12. Recognize Corrosion of Concrete Reinforcement – Causes & Remedies 13. Discuss the Factors Influencing Corrosion of Reinforcement 14. Discuss the Remedial Measures To Protect Reinforcement From Corrosion 15. Recognize water chemistry for better selection of suitable sources of water for human consumption and for livestock. 16. Discuss Water Quality Characteristics. 17. Identify Physical Characteristics of Water 18. Identify Chemical Characteristics of Water, Inorganic Minerals, 		

	<p>Carbonate Equilibrium, Radionuclides, Organic Materials</p> <p>19. Identify of Water Microbiological Characteristics.</p> <p>20. Identify of Water Biological Characteristics.</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following. Chemistry importance fundamental, engineering involves chemistry in the following manners, chemistry applications in building materials (examples) the life cycles of all buildings are limited, chemical influences, the structure of materials. the concept and structure of matter[4 hrs]</p> <p>Cement chemistry, Portland cement chemical component, raw materials of portland cement and it's use, manufacturing cement, burning process : view of complete setup grinding and packaging, burning process : chemical reactions in rotary klin zones, [6 hrs]</p> <p>Properties of cement : setting and hardening, setting and hardening : chemical reactions, classification of cement based on chemical composition, portland cement types, special types of cement, green cement, some types of green cement [7 hrs]</p> <p>Corrosion chemistry, corrosion of concrete reinforcement – causes & remedies, factors influencing corrosion of reinforcement, remedial measures to protect reinforcement from corrosion . [4Hrs]</p> <p>Water chemistry. water quality characteristics, physical characteristics of water, chemical characteristics of water, inorganic minerals , major cations, major anions, carbonate equilibrium, ph and alkalinity, acidity, inorganic indicators of water quality, hardness, total dissolved solids, conductivity, sodium adsorption ratio, [6 hrs]</p> <p>Radionuclides, organic materials, natural organic matter, man-made organics, measurement of organics in water - organic carbon, organic indicators of water quality, biological oxygen demand, chemical oxygen demand, dissolved gases, solubility of gases, dissolved oxygen, microbiological characteristics, biological characteristics of water [6 hrs]</p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>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</p>

	interesting to the students.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.5
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	1	10% (10)	Continuous	
	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 الأسبوعي النظري	
	Material Covered
Week 1	Introduction - Chemistry importance for Engineering
Week 2	The structure of materials. the concept and structure of matter
Week 3	Cement chemistry, burning process : chemical reactions in rotary klin zones
Week 4	Setting and hardening : chemical reactions,
Week 5	Classification of cement based on chemical composition
Week 6	Green Cement
Week 7	Mid-term Exam

Week 8	Corrosion chemistry
Week 9	Remedial measures to protect reinforcement from corrosion
Week 10	Water chemistry
Week 11	Carbonate Equilibrium, pH and Alkalinity, Acidity,
Week 12	Inorganic indicators of water quality, hardness, total dissolved solids, conductivity, sodium adsorption ratio,
Week 13	Radionuclides, organic materials, natural organic matter, man-made organics, measurement of organics in water - organic carbon
Week 14	Organic indicators of water quality, biological oxygen demand, chemical oxygen demand, dissolved gases, solubility of gases, dissolved oxygen, microbiological characteristics, biological characteristics of water
Week 15	Preparatory Week
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Cement and Concrete Chemistry, Wieslaw Kurdowski, Springer Water Chemistry Green Science and Technology of Nature's Most Renewable Resource , S. E. Manahan, CRC press	No
Recommended Texts	Chemistry of Water, Rao, Rao Alla Appa, New Age International (P) Limited	No
Websites	https://chem.libretexts.org	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.





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MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	الجيولوجيا الهندسية		Module Delivery
Module Type	BASIC		Theory Lecture Lab Tutorial Practical Seminar
Module Code	ER102		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1 1	Semester of Delivery	1
Administering Department	<u>Civil Engineering</u>	College	Engineering
Module Leader	Dr. Mohammad Hyder Al-Umar	e-mail	mohammad.hydar@utq.edu.iq
Module Leader's Acad. Title	Assit. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name	Dr. Hussein A. Shaia	e-mail	h.shaia@utq.edu.iq
Review Committee Approval	1/7/2023	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	<p>الهدف الرئيسي هو تعريف الطلاب بالمبادئ الرئيسية للجيولوجيا الهندسية وعلاقتها بالهندسة المدنية. توفر الجيولوجيا الهندسية الدراسة المنهجية للأرض وطبقاتها بالإضافة الى المعادن والصخور حيث يحتاج المهندسون المدنيون بشكل كبير إلى معرفة الخصائص الدقيقة للصخور حتى يتمكنوا من النظر في الصخور المختلفة لأي غرض مقصود مثل حجر الأساس ، ومعادن الطرق ، والركام الخرساني ، وحجر البناء ، ومواد التسقيف لأغراض الديكور.</p>		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>دراسة الطبوغرافيا والعمليات الارضية لتحديد المخاطر الجيولوجية المحتملة وما يرتبط بها من مخاطر من صنع الإنسان والتي يمكن أن يكون لها تأثيرات كبيرة على الهياكل المدنية والتنمية البشرية.</p> <p>يتمتع المهندسون الجيولوجيون والمديون بفهم شامل لكيفية عمل الأرض. هذا مهم جداً للتخفيف من المخاطر المرتبطة بالبيئة. يتخرج العديد من الجيولوجيين الهندسيين بتدريب متخصص في ميكانيكا التربة وميكانيكا الصخور والهندسة الجيوتقنية والصرف والهيدرولوجيا والهندسة المدنية.</p> <p>تعمل هذه العناصر على تحسين قدرة المهندسين الجيولوجيين على فهم وتقليل المخاطر المرتبطة بالتفاعلات مع هياكل الأرض.</p>		
Indicative Contents المحتويات الإرشادية	<p>يحتاج إنشاء مشاريع الهندسة المدنية واسعة النطاق إلى معرفة الظروف الجيولوجية لمنطقة البناء المختارة ، أو يمكن أن يساعد أيضاً في اختيار المنطقة الأكثر ملاءمة لبناء المشروع من وجهة نظر جيولوجية. حدد موقع وخصائص كل من الهياكل التالية: السد، وضع الأساس، الطرق، السكك الحديدية .</p> <p>باختصار ، تساعد الجيولوجيا الهندسية على ضمان استقرار النموذج وفعالية التكلفة لمشاريع البناء لمختلف المشاريع الهندسية. يعد جمع البيانات الجيولوجية للموقع الهندسي مهمة في مراحل التخطيط</p>		

والتصميم والبناء للمشاريع الهندسية.

مسح جيولوجي مفصل للمنطقة قبل البدء في المشروع سيقفل من التكلفة الإجمالية للمشروع. غالبًا ما ترتبط المشكلات المحتملة الشائعة في الخزانات والجسور والهياكل الأخرى ارتباطًا مباشرًا بالجيولوجيا في المنطقة التي تم بناؤها فيها.

قد يتساءل البعض عن أسرار العلاقة بين الهندسة المدنية والجيولوجيا لأنها قد تظهر كفروع منفصلة للعلم بسبب حقيقة أن بعض الهندسة المدنية قد تتطلب بعض التنقيب في التربة والصخور بما في ذلك البناء عليها عن طريق نقل الأرض الأعلى

في بعض الحالات ، يمكن استخدام الصخور المحفورة كمواد بناء ، بينما في حالات أخرى ، قد تشكل الصخر جزءًا كبيرًا من المنتج النهائي ، مثل طريق سريع أو سد.

يتطلب ضمان سلامة وأمن المشروع قدرًا كبيرًا من التخطيط والتصميم والبناء والتكلفة ، والتي تعتمد إلى حد كبير على جيولوجيا موقع البناء ، وعلى رأسها ستحتاج إلى دراسة جيولوجيا المنطقة بدقة

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

الاستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه المادة هي تشجيع الطلاب على اتخاذ القرار الهندسي الصحيح داخل الموقع من خلال المعرفة الجيدة بالجيولوجيا الهندسية ومدى علاقتها الكبيرة في مشاريع الهندسة المدنية . سيتم تحقيق ذلك من خلال الفصول والمواضيع المهمة التي تم اختيارها حيث سيتم اشراك الطلبة بالأنشطة العملية المتمثلة بالبو سترات او التقارير العلمية التي تخص المادة هذا سوف يؤدي الى تطوير مهارات الطلاب وتهيئتهم للواقع العملي

Student Workload (SWL)			
الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/N umber	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	-	-	-	LO # 3, 4, 6 and 7
	Projects / Lab.	-	-	-	
	Report	1	15% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	25% (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	مقدمة عن الجيولوجيا الهندسية ، مهام الهندسة الجيولوجية وعلاقتها بالهندسة المدنية، مهام وإعمال المهندس الجيولوجي ، فروع الهندسة الجيولوجية.
Week 2	المعادن ، الخصائص الفيزيائية للمعادن، التركيب الكيميائي للمعادن ، عالم البلورات، الأشكال البلورية للمعادن.
Week 3	اصل المواد الصخرية وطبيعتها، تركيب الأرض وأغلفتها، دورة الصخور في الطبيعة ،
Week 4	انواع الصخور (الصخور الرسوبية، الصخور المتحولة، الصخور النارية) الاشكال البنائية للصخور النارية والجوفية، أهم الصخور النارية الشائعة.
Week 5	الخواص الفيزيائية للصخور.

Week 6	الخواص الميكانيكية للصخور.
Week 7	Mid-term Exam
Week 8	التجوية، التعرية ، بيئة التجوية
Week 9	جيولوجيا المياه تحت السطحية، المياه الجوفية، اصل ومصادر المياه تحت السطحية، التراكيب الجيولوجية التي تجعل المستوى المائي يأخذ اوضاعا معينة.
Week 10	جيولوجيا المياه تحت السطحية، المياه الجوفية، اصل ومصادر المياه تحت السطحية، التراكيب الجيولوجية التي تجعل المستوى المائي يأخذ اوضاعا معينة.
Week 11	الخرائط الطبوغرافية وعلاقتها بالهندسة المدنية.
Week 12	قراءة الخرائط الطبوغرافية ورسمها .
Week 13	قراءة الخرائط الطبوغرافية ورسمها.
Week 14	الجيولوجيا التركيبية وفهم الخرائط الجيولوجية، مظاهر الطبقات الجيولوجية، الفوالق، عدم التوافق، التثنيات .
Week 15	Preparatory Week
Week 16	Final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	١- الجيولوجيا الهندسية والتحري الموقعي ، الدكتور زهير رمو.	No
Recommended Texts	2- الجيولوجيا الهندسية , الدكتور مقداد حسين علي	No
Websites		

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				

NB 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.





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MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	الورش الهندسية		Module Delivery
Module Type	BASIC		Theory Lecture Lab Tutorial Practical Seminar
Module Code	ER		
ECTS Credits	4		
SWL (hr/sem)			
Module Level	1	Semester of Delivery	
Administering Department	<u>Mechanical Engineering</u>	College	Engineering
Module Leader	Dr. Adnan A. Ugla	e-mail	Adnan-alomary@utq.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name		e-mail	
Review Committee Approval	20/6/2023	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	<p>الهدف الرئيسي هو تعريف الطلاب بالمبادئ الرئيسية للورش الهندسية وعلاقتها بالهندسة المدنية. توفر الورش الهندسية الدراسة المنهجية لعمليات التصنيع و التشغيل و اللحام و الانتهاءات السطحية حيث يحتاج المهندسون المدنيون بشكل كبير إلى معرفة تلك المهارات الهندسية المهمة . المهندس المدني لابد ان يكون مطلع على جميع الاعمال الهندسية المتعلقة بقطع المعادن و تشغيلها و انهاء السطوح و الحصول على منتجات معدنية او غير معدنية بعمليات قطع المعادن المختلفة وكذل عمليات وصل المعادن.</p>		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>دراسة عمليات قطع المعادن و تشكيلها المختلفة و الفهم الجيد لخصائصها و كيفية تحسين مواصفاتها. يتمتع المهندسون المدنيون بفهم شامل لكيفية تصنيع الاجزاء الميكانيكية الحاكمة و طريقة التعامل مع مكانن قطع و تشغيل المعادن و كذلك عمليات سباكة و لحام الاجزاء المعدنية اللازمة. يتخرج العديد من الهندسيين بفهم جيد عن التعامل مع المواد المعدنية و طرق تشكيلها و قطعها و لحامها و غيرها من المهارات المهمة و التي يتعلمها في الورش الهندسية المتخصصة.</p>		
Indicative Contents المحتويات الإرشادية	<p>مقدمة عامة عن الورش الهندسية و المعدات و الادوات المستعملة فيها، دراسة عمليات قطع المعادن بعمليات الخراطة، دراسة انواع المكانن المستعملة في عمليات الخراطة و استعمالات كل نوع منها، اجراء تمارين عملية على الخراطة، دراسة عملية التفريز، تصنيف انواع مكانن التفريز و طرق لتفريز الشانعة، اجراء تمارين عملية عن عمليات التفريز و معرفة محاسن و مساوئ التفريز، دراسة عمليات القشط و استعمالاتها و اجراء تجارب عملية عليها، دراسة عملية التنعيم السطحي و الاسطواني و طرق استمالها، دراسة عمليات اللحام الشانعة و مقارنة الانواع المستعملة و تحديد استعمالات كل نوع منها، دراسة انواع اسلاك اللحام المختلفة و تحديد الانواع المفيدة منها. اجراء تجارب عملية و اعداد تقارير عنها.</p>		

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>الاستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه المادة هي تشجيع الطلاب على اتخاذ القرار الهندسي الصحيح داخل الموقع من خلال المعرفة الجيدة بالورش الهندسية ومدى علاقتها الكبيرة في مشاريع الهندسة المدنية في حقل العمل. سيتم تحقيق ذلك من خلال المواضيع المهمة التي تم اختيارها حيث سيتم اشراك الطلبة بالأنشطة العملية المتمثلة بالتمارين العملية و اعداد التقارير العلمية التي تخص المادة هذا سوف يؤدي الى تطوير مهارات الطلاب وتهيئتهم للواقع العملي المتقدم.</p>
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Student Workload (SWL)

الحمل الدراسي للطلاب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل		Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل		Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	
Total SWL (h/sem) 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, 10 and 11
	Assignments	-	-	-	LO # 3, 4, 6 and 7
	Projects / Lab.	-	-	-	
	Report	1	15% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	25% (10)	7	LO # 1-7
	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	مقدمة عامة عن الورش الهندسية ، مهام الورش الهندسية وعلاقتها بالهندسة المدنية.
Week 2	مقدمة عامة عن الورش الهندسية و المعدات و الادوات المستعملة فيها
Week 3	دراسة قطع المعادن بعملية الخرطة، دراسة انواع المكانن المستعملة في عمليات الخراطة و استعمالات كل نوع منها،
Week 4	اجراء تمارين تطبيقية على مكانن الخراطة
Week 5	دراسة قطع المعادن بعملية التفريز، دراسة انواع المكانن المستعملة في عمليات التفريز و استعمالات كل نوع منها،
Week 6	اجراء تمارين تطبيقية على مكانن التفريز
Week 7	Mid-term Exam
Week 8	دراسة قطع المعادن بعملية التنعيم، دراسة انواع المكانن المستعملة في عمليات التنعيم و استعمالات كل نوع منها،
Week 9	اجراء تمارين تطبيقية على مكانن التنعيم
Week 10	دراسة قطع المعادن بعملية البرادة، دراسة انواع الادوات و العدد المستعملة في عمليات البرادات
Week 11	اجراء تمارين تطبيقية في ورشة البرادة
Week 12	دراسة وصل و ربط المواد المعدنية، دراسة انواع المكانن المستعملة في عمليات اللحام و استعمالات كل نوع منها،
Week 13	اجراء تمارين تطبيقية على مكانن اللحام اليدوي و الشبه مؤتمت
Week 14	اجراء تمارين تطبيقية في عملية اللحام الغازي (الشعلة الاوكسي-اتسلينية)
Week 15	Preparatory Week
Week 16	Final Exam

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

Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	١- الورش الهندسية.	yes
Recommended Texts	كراس خاص بالورش الهندسية	yes
Websites		

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work

				required

Note:

NB 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.





Ministry of Higher Education and
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University of Thi-Qar
College of Engineering
Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	ENGINEERING DRAWING		Module Delivery
Module Type	BASIC		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input checked="" type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	ER104		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	
Administering Department	ECTS	College	Engineering College
Module Leader	Asst. Prof. Dr. Laith Hady Al-ossmi	e-mail	laith-h@utq.edu.iq
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Asst. Prof. Dr. Laith Hady Al-ossmi	e-mail	laith-h@utq.edu.iq
Peer Reviewer Name	Asst. Prof. Dr. Laith Hady Al-ossmi	e-mail	laith-h@utq.edu.iq
Review Committee Approval	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	<ol style="list-style-type: none"> 1. Understand the principles of orthographic projection and create orthographic projections of simple objects. 2. Apply appropriate dimensioning techniques and annotate engineering drawings accurately. 3. Interpret and create section views, auxiliary views, and isometric drawings, (2D and 3D). 4. Demonstrate an understanding of geometric tolerancing and its application in engineering drawings. 5. Utilize engineering design skills to create, edit, and manipulate engineering drawings. 6. Recognize and apply relevant industry standards and conventions in engineering drawing practices. 7. Develop effective communication skills by presenting and explaining engineering drawings. 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. To develop a knowledge of both manual and skills generated engineering drawing. 2. To create and edit a variety of engineering drawings. 3. Communicate effectively in a modern technical environment. 4. Construct and present quality engineering drawings in a well drafted manner. 5. Present correct lettering, figures and dimensions to a defined style and standard. 6. Produce detailed Engineering drawings using 2D and 3D drafted skills. 		
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p><u>Part A – Sketching (50 hr)</u></p> <ol style="list-style-type: none"> 1. Introduction to Engineering Drawing 2. Importance and purpose of engineering drawing 3. Role of engineering drawing in the design and manufacturing 		

	<p>process</p> <ol style="list-style-type: none"> 4. Paper size, Lettering & title blocks 5. Drawing Tools and Equipment 6. Selection and use of drawing instruments. 7. Types of lines. 8. Geometrical constructions. 9. Dimensions. <p><u>Part B- Orthographic Projection (10hr)</u></p> <ol style="list-style-type: none"> 1- Principles of orthographic projection. 2- Creating and interpreting orthographic projections. 3- Creating section views to show internal features. 4- Missing views, 2D. 5- Sectional views. <p><u>Part B –Isometric Drawing (15hr)</u></p> <ol style="list-style-type: none"> 6- Introduction to Isometric Drawing 7- Principles and construction of isometric drawings 8- Understanding and applying relevant standards. 9- Applying Isometric drawings.
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>The main strategy that will be adopted in delivering this module is:</p> <ol style="list-style-type: none"> 1-Lectures: Instructors typically provide lectures to introduce and explain the fundamental concepts, principles, and techniques of engineering drawing. This includes topics such as orthographic projection, dimensioning, and sectioning. Lectures can be supplemented with visual aids, such as slides or handouts, to enhance understanding. 2-Hands-on Practice: Engineering drawing is a practical skill, and students need ample opportunities for hands-on practice. Instructors typically assign drawing exercises and projects that involve creating various types of drawings, including 2D and 3D representations. Students can work individually or in groups to apply the learned concepts and develop their drawing skills. 3-Assignments and Homework: Assignments and homework are an essential part of the learning process. They provide students with opportunities to reinforce their understanding, apply concepts to real-world scenarios, and practice drawing techniques. Assignments may

	involve drawing specific objects, interpreting technical drawings, or solving drawing-related problems. 5-Assessments and Examinations: Regular assessments, quizzes, or examinations are conducted to evaluate students' comprehension of the subject matter. These assessments test their ability to interpret drawings, apply standards, and produce accurate and detailed engineering drawings.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
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	
	Report	1	10% (10)	13	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 الأسبوعي النظري	
	Material Covered
Week 1	Introduction to engineering drawing, standards information, paper size and lines types, etc.
Week 2	Lettering, title blocks, and introduction to geometrical constructions.
Week 3	Geometrical Constructions essential principles.
Week 4	Geometrical constructions practices.

Week 5	Theory of projections and orthogonal projection.
Week 6	Orthographic projection and applying sketches.
Week 7	Introduction to Isometric projection
Week 8	Isometric and oblique projections
Week 9	Dimensions and Missing view
Week 10	Mid-term Exam
Week 11	Introduction to Isometric projection
Week 12	Isometric and oblique projections
Week 13	Understanding and applying relevant standards, such as EXONO and PRESPECTIVE.
Week 14	Dimensions and Missing view.
Week 15	Preparatory Week before the final Exam.
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	None.
Week 2	None.
Week 3	None.
Week 4	None.
Week 5	None.
Week 6	None.
Week 7	None.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering drawing, by Preparation Dr. Abdul Rasul Alkhfaf.	Yes
Recommended Texts	1. "Engineering Drawing" by Frederick E. Giesecke, Alva Mitchell, Henry C. Spencer, Ivan L. Hill, and John T. Dygdon. 2. "Engineering Graphics: Tools for the Mind" by Gary R. Bertoline, Eric N. Wiebe, and Nathan W. Hartman.	No

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.





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Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	CALCULUS		Module Delivery	
Module Type	BASIC		Theory Lecture Tutorial	
Module Code	ER103			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	1	Semester of Delivery		1
Administering Department	Civil Eng.	College	Engineering	
Module Leader	Dr. Ali M. Naser		e-mail	ali-majid@utq.edu.iq
Module Leader's Acad. Title	Lecture	Module Leader's Qualification	Ph.D.	
Module Tutor	None		e-mail	
Peer Reviewer Name			e-mail	
Review Committee Approval			Version Number	

Relation With Other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	None		Semester	
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. The first years of all mathematics programs are designed to give students a thorough grounding in a wide spectrum of mathematical ideas, techniques and tools in order to equip them for the later stages of their course.2. During first year, as well as consolidating, broadening and extending core material from pre-University study, we initiate a cultural transition to the rigorous development of mathematics which is characteristic at University.3. Students will develop both their knowledge of mathematics as a subject and their reasoning and communication skills, through lectures, tutorials, seminars, guided self-study, independent learning and project work. This development is addressed in all of our first year modules, although different modules have a different emphasis.4. In addition to the above broad aims of the first year, this module focuses on ensuring that students have competence in a wide range of essential concepts, techniques and applications of differential and integral calculus.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<p>Subject content</p> <ol style="list-style-type: none">1. Functions: Are fundamental to the study of calculus. In this chapter we review what functions are and how they are visualized as graphs, how they are combined and transformed, and ways they can be classified.2. Limits and Continuity: In this chapter we develop the concept of a limit, first intuitively and then formally. We use limits to describe the way a function varies. Some functions vary continuously; small changes in x produce only small changes in $f(x)$. Other functions can have values that jump, vary erratically, or tend to increase or decrease without bound. The notion of limit gives a precise way to distinguish among these behaviors.3. Derivatives: In point 2 we discussed how to determine the slope of a curve at a point and how to measure the rate at which a function changes. Now that we have studied limits, we can make these notions precise and see that both are interpretations of the derivative of a function at a point. The derivative is used to study a wide range of problems in mathematics, science economics, and medicine. These problems include finding solutions to very general equations, calculating the velocity and acceleration of a moving object, describing the path followed by a light ray going from a point in air to a point in water.4. Applications of Derivatives:

	<p>One of the most important applications of the derivative is its use as a tool for finding the optimal (best) solutions to problems. Optimization problems abound in mathematics, physical science and engineering.</p> <p>5. Integrals: A great achievement of classical geometry was obtaining formulas for the areas and volumes of triangles, spheres, and cones. In this chapter we develop a method, called integration, to calculate the areas and volumes of more general shapes. The definite integral is the key tool in calculus for defining and calculating areas and volumes.</p> <p>6. Applications of Definite Integrals:</p> <p>7. We saw that a continuous function over a closed interval has a definite integral, which is the limit of Riemann sum approximations for the function. We found a way to evaluate definite integrals using the fundamental theorem of calculus. We saw that the area under a curve and the area between two curves could be defined and computed as definite integrals. In this chapter we will see some of the many additional applications of definite integrals. We will use the definite integral to define and find volumes, lengths of plane curves, and areas of surfaces of revolution.</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>Part A: ALGEBRA And Geometry</p> <ol style="list-style-type: none"> 1- polynomial equations [Linear Equations and Simultaneous, Linear Equations, Quadratic Equation, Logarithms equations, Indicial Functions [8 hrs] 2- Intervals, Trigonometric Functions, Inverse of Trigonometric Functions, Hyperbolic Functions. [8 hrs] 3- Increasing and Decreasing Functions, Even and Odd Function, Sum, difference, Products, and Quotients, Combining Function Algebraically, Composition of Function, Cartesian Coordinates in the Plane, Increments and Straight Lines, Distance and Circle in Plane. [8 hrs] <p>Part B: DERIVATIVES</p> <ol style="list-style-type: none"> 1- Limits. The Limits Laws. Finite Limits. Continuity. [8 hrs] <ul style="list-style-type: none"> - Tangent and Derivatives. Differentiation. Slope, Tangent Line. Testing the Definition. The Derivatives as a Function. Differentiation Rules. Equation of Tangent. [8 hrs] 2- Derivatives of Trigonometric Function. The Chain Rule. Second and higher order Derivatives. The Derivatives as a Rate of change. Motion along line. [8 hrs] <ul style="list-style-type: none"> - Increase and Decrease Function. Concavity. Related Rates Equations. Extreme Values of Functions. [8 hrs]

	<p>3- Derivative of inverse trigonometric function Derivative of the natural exponential and log functions. Derivatives of hyperbolic function. Related Rates Equations. Extreme Values of Functions. [8 hrs]</p> <p>Part C:INTEGRATION</p> <p>1- Integral calculus. Standard integration. Definite integrals. [8 hrs]</p> <p>2- Integration using algebraic substitutions. Integration using trigonometric substitution. Partial fraction. Integration using partial fraction. . Integration by parts. [16 hrs]</p> <p>- Areas under and between curves. Mean and root mean square values. Centroids of simple shapes. Second moments of area. Arc Length and Surfaces of Revolution. [16 hrs]</p> <p>3- Numerical integration. [8 hrs]</p> <p>4- Work</p> <p>- Fluid Pressure and Fluid Force. [8 hrs]</p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
Strategies	<p>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.</p>

<p>Student Workload (SWL) الحمل الدراسي للطالب</p>			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	123	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

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

Formative assessment	Quizzes	3	20% (20)	3, 8, 15	LO #1, 2, 3, 4, 5, 6 and 7
	Assignments	4	10% (10)	3, 8, 12, 15	LO #1, 2, 3, 4, 5, 6 and 7
	Projects / Lab.	-	-	-	-
	Report	2	10% (10)	6, 15	LO # 4 and 7
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1 to 8
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	<ul style="list-style-type: none"> ▪ Polynomial Equations ▪ Functions
Week 2	<ul style="list-style-type: none"> ▪ Intervals and Inequalities ▪ Types of Function. ▪ Trigonometric Functions. ▪ Hyperbolic Functions.
Week 3	<ul style="list-style-type: none"> ▪ Fundamentals of functions and how they are visualized as graphs.
Week 4	<ul style="list-style-type: none"> ▪ Limits. ▪ Continuity.
Week 5	<ul style="list-style-type: none"> ▪ Derivatives.
Week 6	<ul style="list-style-type: none"> ▪ Derivatives of Trigonometric Function. ▪ The Chain Rule. ▪ Second and higher order Derivatives. ▪ The Derivatives as a Rate of change. ▪ Motion along line.
Week 7	<ul style="list-style-type: none"> ▪ The Derivatives applications.
Week 8	<ul style="list-style-type: none"> ▪ Derivative of inverse trigonometric function ▪ Derivative of the natural exponential and log functions. ▪ Derivatives of hyperbolic function. ▪ Related Rates Equations. ▪ Extreme Values of Functions.
Week 9	<ul style="list-style-type: none"> ▪ Integral calculus ▪ Standard integration ▪ Definite integrals
Week 10	<ul style="list-style-type: none"> ▪ Integration using algebraic substitutions ▪ Integration using trigonometric substitution
Week 11	<ul style="list-style-type: none"> ▪ Partial fraction ▪ Integration using partial fraction

	<ul style="list-style-type: none"> Integration by parts
Week 12	<ul style="list-style-type: none"> Areas under and between curves Mean and root mean square values
Week 13	<ul style="list-style-type: none"> Centroids of simple shapes Second moments of area Arc Length and Surfaces of Revolution
Week 14	<ul style="list-style-type: none"> Numerical integration
Week 15	<ul style="list-style-type: none"> Work Fluid Pressure and Fluid Force
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Calculus, 14th edition, 2018. By Thomas Calculus, 2th edition, 2002. By James Stewart.	Yes
Recommended Texts	1. Calculus, 1th edition, 2003. By Steven G. Krantz. 2. Algebra, 3th edition, 2003. By Rhonda Huettenmueller. 3. Fundamental of college geometry, 2th edition, 1970, by Edwin M. Hemmerling. 4. Trigonometry, 3rd edition, 2003. By Stan Gibilisco. 5. Algebra and Trigonometry, 3rd edition, 2007, By Judith A. Beecher, Judith A. Penna, Marvin L. Bittinger.	No
Websites		

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.





Ministry of Higher Education and
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College of Engineering
Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	APPLIED MATHEMATICS		Module Delivery	
Module Type	CORE		Theory Lecture, Electronic Lecture Homework and Reports	
Module Code	ER203			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	1	Semester of Delivery		1
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Dr. Alaa Alsharaballi		e-mail	alaa.majed@utq.edu.iq
Module Leader's Acad. Title	Lecture	Module Leader's Qualification	Ph.D.	
Module Tutor	None		e-mail	None
Peer Reviewer Name	Dr.Ali Majid Al_kinani		e-mail	ali-majid@utq.edu.iq
Review Committee Approval			Version Number	1.0

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Calculus (Module Code: ER103)	Semester	One
Co-requisites module	None	Semester	
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	<ol style="list-style-type: none"> 1. To equip students with the skills that required to calculate arithmetic operations of matrices such as adding and subtracting. To use matrix methods to solve system of equations. 2. To introduce vectors and application in problems such as speed, velocity, and acceleration. 3. To develop problem solving skills in partial derivative and differential equations. 4. To understand how to solve various type of first order differential equations and higher order. 5. This course deals with the concept of series and type of series such as Taylor Series and Maclaurin Series. 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Define matrices types and arithmetic operations on matrices and multiplication of matrices. 2. Recognize vectors in 2D and 3D and performing dot product and cross product. 3. Generation of cylinders and quadric surfaces and their equations. 4. Describe and use of several formulas for vector such as arc length, unit tangent vectors, curvature, unit normal vectors, torsion and unit binormal vector. 5. Discuss Functions of Several Variables Partial derivatives, Chain rule. 6. Learn and solve problems of extreme values and saddle points and understand Lagrange. 7. Describe partial derivative and solve related problems. 8. Define differential equations and ordinary differential equations. 9. List four types of ordinary differential equations (ODE) (separable, 		

	<p>exact, homogeneous, and linear). Solve related problems of ODE.</p> <p>10. Solve problems of higher order differential equation such as second order linear homogeneous differential equation and nth order differential equations.</p> <p>11. Solve problems by the The Method of Undetermined coefficients Multiple Integrals (introduction), The Method of Variation of parameter, Double Integrals in Cartesian coordinate,</p> <p>12. Solve problems related to Polar Coordinates, Double Integrals with Polar Coordinates, Applications of Double Integrals.</p> <p>13. Solve problems using triple Integrals in Cartesian, cylindrical, and spherical coordinates. Understand application of Triple Integrals and solve problems.</p> <p>14. Understand Sequences and Series, Tests of convergence, Power Series, Taylor Series, Maclaurin Series.</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Mathematics III</u></p> <p>Matrices: Simple matrix algebra. Determinants. Applications to the solution of simultaneous linear equations.</p> <p>Vectors: Simple vector algebra. The scalar and vector products.</p> <p>Arc Length and the Unit Tangent Vector T, Curvature and the Unit Normal Vector N</p> <p>Rectangular and polar forms.</p> <p>Functions of Several Variables, Partial derivatives, Chain rule</p> <p><u>Part B – Mathematics IV</u></p> <p>Differential Equations: Solution of 1st order ODEs</p> <p>Higher order differential equation</p> <p>Triple Integrals, cartesian and polar coordinates</p> <p>Sequences and Series</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>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. Students will practice searching for mathematics tools that help with solving mathematics problems to first verify their manual solution and also to improve their ability of using assistance tools such as online mathematics tools and programs. These tools speedup solving problems and work with basic knowledge a beneficial solid mass of cognition.</p> <p>Building team work by making a groups of students to prepare a report for mathematic topics and problems and getting the required information and sources to solve them.</p>
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	123	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
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	4	20% (10)	3, 6, 10, 13	
	Assignments	10	10% (10)	2-6, 9-14	
	Projects / Lab.				
	Report	1	10% (10)	12	
Summative assessment	Midterm Exam	2 hr	10% (10)	7	L# 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	Matrices(introduction), Basic Operations in Matrices, Determinant of Matrices, Rank of Matrices, Solving Linear Systems of Equations (introduction), Cramer's Rule, Inverse Matrix method.
Week 2	Vectors, Three-Dimensional Coordinate Systems, The Dot Product, The Cross Product, Lines and Planes in Space,
Week 3	Cylinders and Quadric Surfaces, Vector Functions, Modeling Projectile Motion
Week 4	Arc Length and the Unit Tangent Vector T, Curvature and the Unit Normal Vector N, Torsion and the Unit Binormal Vector B, Planetary Motion and Satellites.
Week 5	Functions of Several Variables, Partial derivatives, Chain rule, Directional Derivatives and Gradient Vectors
Week 6	Tangent Planes and Differentials, Extreme Values and Saddle Points, Lagrange multiplier,
Week 7	Partial Derivatives with Constrained Variables. Mid-term Exam
Week 8	Differential Equations (Basic concepts, Ordinary Differential Equations(ODEs))
Week 9	Separable First Order (ODEs), Homogenous First Order (ODEs), Exact First Order (ODEs), Linear First Order (ODEs)
Week 10	Second Order Linear Homogenous (ODEs) With Constant Coefficients, nTh Order Linear Homogenous (ODEs)With Constant Coefficients
Week 11	The Method of Undetermined coefficients, The Method of Variation of parameter.
Week 12	Multiple Integrals (introduction), Double Integrals in Cartesian coordinate, Polar Coordinates, Double Integrals with Polar Coordinates, Applications of Double Integrals
Week 13	Triple Integrals in Cartesian coordinate, Triple Integrals in Cylindrical coordinate, Triple Integrals in Spherical Coordinates, Application of Triple Integrals, Substitutions in Multiple Integrals,
Week 14	Sequences and Series, Tests of convergence, Power Series, Taylor Series, Maclaurin Series
Week 15	Preparatory Week
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	-----
Week 2	-----

Week 3	-----
Week 4	-----
Week 5	-----
Week 6	-----
Week 7	-----

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Calculus by Thomas	Yes
Recommended Texts	Differential Equations (4th edition) SHAUM'S outlines.	Yes
Websites		

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.



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Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	SURVEYING AND GIS		Module Delivery
Module Type	CORE		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CE208		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	Semester of Delivery	
Administering Department	Type College Code	College	Type College Code
Module Leader	Mohammad Hyder Al-Umar	e-mail	mohammad.hydar@utq.edu.iq
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name	Mourtadha Sarhan Sachit	e-mail	murtadha-s@utq.edu.iq
Review Committee Approval		Version Number	1.0

Relation with Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Surveying	Semester	Three
Co-requisites module	None	Semester	
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	<p>The primary goal of this module is to familiarise the students with the fundamental concepts of advanced survey technologies such as Global Navigation Satellite System (GNSS), Unmanned Aerial Vehicle (UAV) survey, Underground Utility Surveys (UUS), and Geographic Information Systems (GIS) and how they relate to civil engineering. This provides a foundation for the positioning, mapping, and analysis employed in science and virtually all parts of industry. Such advanced technologies aid users in comprehending patterns, relationships, and geographic context. Along with better management and decision-making, benefits also include enhanced communication and efficiency.</p>		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>At the end of this module, the student will be able to:</p> <ol style="list-style-type: none"> 1. Understanding the types of GNSS systems, their Segments and Global Coordinate Frames. 2. Master the use of hand-held GNSS devices and mobile-based applications. 3. Knowing the observation methods by GNSS and the sources of associated errors and how to avoid or mitigate them. 4. Master the use of GNSS static observation methods and how to process their data via online services. 5. Understanding the types, sources and resolutions of satellite images and their potential applications in civil engineering. 6. Distinguishing between satellite images and aerial images, and how to prepare a flight plan for conducting UAV surveys. 7. Understanding the components and types of GIS software. 8. Dealing with different types of spatial data in the ArcGIS Pro software. 9. Create, visualize and edit geodatabases. 10. Projections and Coordinate Systems (Defining, Changing). 11. Map Projections types. 12. Joining and Relating Tables. 13. Working on Model Builder. 		
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following:</p> <ul style="list-style-type: none"> • Introduction to Global Navigation Satellite System (GNSS), Global Coordinate Frames (Ellipsoid, Geoid, Datum), and GNSS Segments (Space Segment, Control Segment, and User Segment). [2hrs] • Fundamentals of GNSS Positioning, GNSS Signals, and GNSS Positioning 		

	<p>Strategies [Absolute Positioning, Differential Positioning (Static and Kinematic Methods)]. [2hrs]</p> <ul style="list-style-type: none"> • Errors and Mistakes in GNSS Measurements (Ephemeris and Clock Errors, Atmospheric Errors, Multipath and Receiver Noise, and Satellite Geometry), GNSS applications in civil engineering. [2hrs] • Introduction to Satellite Imagery, type of Satellite Imagery, Satellite Imagery resolutions, Satellite Imagery sources, Characteristics and statistics of Satellite Imagery, and the importance of satellite imagery in civil engineering. [2hrs] • Introduction to an unmanned aerial vehicle (UAV), type of aerial photographs, Drone survey requirements and criteria, Drone survey applications in civil engineering. [2hrs] • Introduction to Underground Utility Surveys (UUS), Radio Frequency Location (RFL), Ground Penetration Radar (GPR), and UUS applications in Civil engineering. [2hrs] • Introduction to GIS, GIS Components, GIS Software. [2hrs] • Spatial Data types (Raster Data, Vector data, Metadata), Spatial Data input and editing, and Topology. [2hrs] • Geodatabase, Symbology, and Creating digital maps. [2hrs]. • Projections and Coordinate Systems (Defining, Changing). [2hrs] • Map Projections types. [2hrs] • Joining and Relating Tables. [2hrs] • Module Builder in ArcGIS Pro. [2hrs]
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>The primary approach that will be used in teaching this course is to encourage students to use new technology in civil engineering, which aids the civil engineer in making the best engineering decisions on the site through a solid understanding of GNSS, UAV, UUS, and GIS technologies and its excellent relationship to civil engineering projects. This will be accomplished by having students engage in practical activities modeled after scientific laboratories relevant to the subject in the key chapters and subjects that have been chosen. As a result, students' skills will be improved and they will be better equipped for real-world situations.</p>
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	50	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	25	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	5% (5)	5	LO #1 - 4
	Assignments	1	5% (5)	13	LO # 8 - 11
	Projects / Lab.	12	20% (20)	Continuous	All
	Report	-	-	-	-
Summative assessment	Midterm Exam	2 hr	20% (20)	7	LO # 1- 6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Satellite Survey Engineering via GNSS Introduction to Global Navigation Satellite System (GNSS), Global Coordinate Frames (Ellipsoid, Geoid, Datum), and GNSS Segments (Space Segment, Control Segment, and User Segment)
Week 2	Satellite Survey Engineering via GNSS Fundamentals of GNSS Positioning, GNSS Signals, and GNSS Positioning Strategies [Absolute Positioning, Differential Positioning (Static and Kinematic Methods)]
Week 3	Satellite Survey Engineering via GNSS Errors and Mistakes in GNSS Measurements (Ephemeris and Clock Errors, Atmospheric Errors, Multipath and Receiver Noise, and Satellite Geometry), GNSS applications in civil engineering
Week 4	Satellite Survey Engineering via Imagery Introduction to Satellite Imagery, type of Satellite Imagery, Satellite Imagery resolutions, Satellite Imagery sources, Characteristics and statistics of Satellite Imagery, and the importance of satellite imagery in civil engineering.
Week 5	Aerial Survey Engineering (Drone Survey) Introduction to an Unmanned Aerial Vehicle (UAV), type of aerial photographs, Drone survey requirements and criteria, Drone survey applications in civil engineering
Week 6	Underground Utility Surveys Introduction to Underground Utility Surveys (UUS), Radio Frequency Location (RFL), Ground Penetration Radar (GPR), and UUS applications in Civil engineering
Week 7	Mid-term Exam

Week 8	Geographical Information System (GIS) Introduction to GIS, GIS Components, GIS Software
Week 9	Spatial Data Managements Spatial Data types (Raster Data, Vector data, Metadata), Spatial Data input and editing, and Topology
Week 10	Spatial Data Storage and Visualization (creating maps based on vector and raster data)
Week 11	Projections and Coordinate Systems (Defining, Changing).
Week 12	Map Projections types.
Week 13	Joining and Relating Tables.
Week 14	Model Builder in ArcGIS Pro.
Week 15	Preparatory Week
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Using GNSS-Based Mobile Apps for Navigational Positioning
Week 2	Training on Handheld GNSS Devices
Week 3	Training on Differential GNSS Instruments
Week 4	Application of Static Positioning Strategies
Week 5	Online Processing of GNSS Data
Week 6	Application of Kinematic Positioning Strategies
Week 7	Mid-term Exam
Week 8	Installing and quick-start with ArcGIS Pro
Week 9	Training on ArcGIS Pro: <ul style="list-style-type: none"> • Setup the coordinate system and datum. • Creating New Shapefile and Geodatabase. • Displaying Categories (Polygons).
Week 10	Training on ArcGIS Pro: <ul style="list-style-type: none"> • Displaying Numerical Variables (Polygons). • Displaying Numerical Variables (Points). • Displaying Numerical Variables (Graph on Map).
Week 11	Training on ArcGIS Pro: <ul style="list-style-type: none"> • Displaying Numerical Variables (Multiple Attributes). • Displaying Raster (Grid).

Week 12	Training on ArcGIS Pro: <ul style="list-style-type: none"> • Defining the projection. • Change the projection of layers into Lambert Conformal Conic.
Week 13	Training on ArcGIS Pro: <ul style="list-style-type: none"> • Change the projection of a raster (grid). • Join and relating tables.
Week 14	<ul style="list-style-type: none"> • Training on the uses of Editor tools • Working on Model Builder.
Week 15	Preparatory Week
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	<p>GNSS–global navigation satellite systems: GPS, GLONASS, Galileo, and more, Hofmann-Wellenhof, Bernhard, Herbert Lichtenegger, and Elmar Wasle, Springer Science & Business Media, 2007.</p> <p>An introduction to geographical information systems [electronic resource] by Ian Heywood, Sarah Cornelius, Steve Carver, Fourth edition (2011).</p>	No
Recommended Texts	<p>Lo, Chor P., Yeung, Albert K. W., 2002, Concepts and Techniques in Geographic Information Systems, Upper Saddle River, New Jersey: Prentice Hall</p> <p>Geographic Information Systems for Geoscientists : Modeling with GIS, Bonham-Carter, G.F., 1995 Pergamon, Oxford, 416 p.</p>	No
Websites	<p>https://gns.ga.gov.au/auspos</p> <p>https://pro.arcgis.com/en/pro-app/latest/help</p>	

APPENDIX:

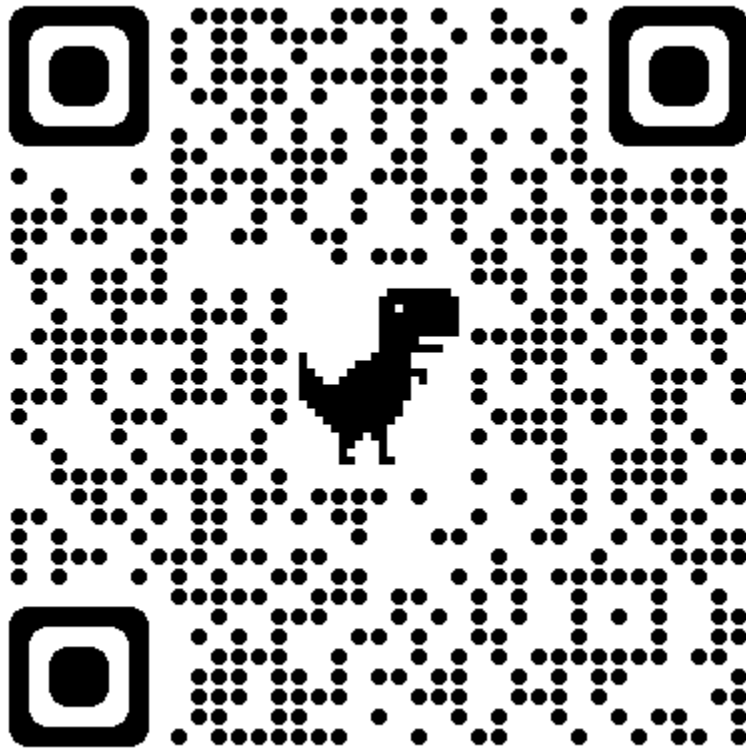
GRADING SCHEME

مخطط الدرجات

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

NB For example, a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. Decimal places above or below 0.5 will be rounded to the higher or lower full mark. Because it is against University policy to allow "near-pass fails," the only change to the grades given by the original marker(s) will be the automatic rounding described above.





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MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	ENGINEERING SURVEYING		Module Delivery
Module Type	CORE		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input checked="" type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CE202		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Mourtadha Sarhan Sachit	e-mail	murtadha-s@utq.edu.iq
Module Leader's Acad. Title	Assist. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Sajaa Muhsein Khazael	e-mail	sajaa.mk@utq.edu.iq
Peer Reviewer Name	Mohammad Hyder Al-Umar	e-mail	mohammad.hydar@utq.edu.iq
Review Committee Approval	01/07/2023	Version Number	1.0

Relation with Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	Advanced Surveying and GIS	Semester	Four

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This module aims to provide the student with knowledge and skill in conducting engineering measurements that determine the locations of points on or near the earth's surface. Engineering measurements are represented but are not limited to distances, angles and coordinates which are the key elements for civil engineers to stake out engineering projects or to prepare layouts. Therefore, familiarity with the devices and methods of observation and calculation to execute such tasks with high accuracy is one of the primary objectives of the CE202 module. This is the basic theme of all engineering surveys.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of this module, the student will be able to: <ol style="list-style-type: none">1. Connect theoretical knowledge with engineering work to solve real-world problems.2. Work as a team and prepare technical reports for survey tasks.3. Diagnose and deal with errors and mistakes associated with filed observations.4. Conduct the horizontal measurements using hand-held tools.5. Master the use of level instruments to measure elevations.6. Organize and calculate leveling tables professionally.7. Plot longitudinal and cross sections of roads.8. Solve mathematical problems to calculate the areas and volumes of earthworks.9. Master the use of the theodolite in measuring angles and directions.10. Solve mathematical problems using coordinate geometry.11. Master the use of the Total Station instrument.12. Read and produce the topographical and contour maps.13. Calculate and stake out the elements of horizontal and vertical curves of roads.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Classification of surveying, theory of errors in surveying observations, scales and units of measurement. [7 hrs] Direct and indirect observations of distance, tape survey, EDM survey, mistakes and errors correction. [7 hrs] Principles and methods of leveling (direct leveling, trigonometric leveling, barometric leveling, hydrostatic leveling), Leveling instruments (types of devices, device components, device setup, leveling staff), and leveling applications (leveling table, differential leveling, reciprocal leveling), Reducing errors and eliminating mistakes in leveling, closed leveling, digital and laser leveling devices. [21 hrs] Leveling of profile and cross sections, computations and drawing of sections,

	<p>Grade line, cut and backfill calculations, and Contour lines mapping. [14 hrs]</p> <p>Land-plots area calculations, cross-sections area calculations, volumes of earthworks. [7 hrs]</p> <p>Types of meridian and directions, horizontal and vertical angles, theodolite (Basic principles, types, components, setup, usage), and sources of errors in Theodolite survey. [14 hrs]</p> <p>Types of coordinate systems, forward and Inverse computations, types of Traverse, Traversing measurements and computations, Basic principles of Total Station, types, components, setup, usage, and sources of errors in total station survey. [14 hrs]</p> <p>Planning survey, design survey, construction survey, horizontal and vertical curves, calculations and survey process for staking out horizontal and vertical curves. [14 hrs]</p>
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>The primary strategy that will be adopted in delivering this module is to encourage students' participation in the exercises and teamwork, while at the same time refining and expanding their critical thinking skills. This will be achieved through:</p> <ul style="list-style-type: none"> • Classes • Oral Questions and Discussions • Interactive tutorials • Assignments • Fieldwork activities • Exhibitions Participation
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	110	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	65	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	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	2	10% (10)	4, 12	LO #3, 4, 8 and 10
	Assignments	1	10% (10)	13	LO # 11 and 12
	Projects / Lab.	12	10% (10)	Continuous	All
	Lab Test	1	10 % (10)	7	-
Summative assessment	Midterm Exam	2 hr	10% (10)	7	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	Basic Principles of Engineering Surveying
Week 2	Horizontal Distance Measurements
Week 3	Vertical Distance Measurement (Leveling)
Week 4	Vertical Distance Measurement (Leveling)
Week 5	Vertical Distance Measurement (Leveling)
Week 6	Longitudinal and Cross sections
Week 7	Mid-term Exam + Contour mapping and calculations
Week 8	Area and volume Computations
Week 9	Directions and Angles Measurements
Week 10	Angles Measuring Instrument
Week 11	Coordinate geometry and Traversing
Week 12	Total Station
Week 13	Roads Surveying
Week 14	Roads Surveying
Week 15	Preparatory Week
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Measure the observer's pace length
Week 2	Lab 2: Measure the horizontal distance using tape and wheel
Week 3	Lab 3: Field training in the use of level instrument
Week 4	Lab 4: Application of direct leveling
Week 5	Lab 5: Application of differential leveling
Week 6	Lab 6: Tow-peg Test
Week 7	Lab 7: Practical Test
Week 8	Lab 8: Field training in the use of Theodolite instrument
Week 9	Lab 9: Measuring horizontal angles for a closed traverse using theodolite
Week 10	Lab 10: Measuring vertical angles to find heights using theodolite
Week 11	Lab 11: Stake out a building using theodolite and measuring tape
Week 12	Lab 12: Field training in the use of Total Station instrument
Week 13	Lab 13: Stake out a horizontal curve using Total Station
Week 14	Lab 14: Practical Test

Learning and Teaching Resources

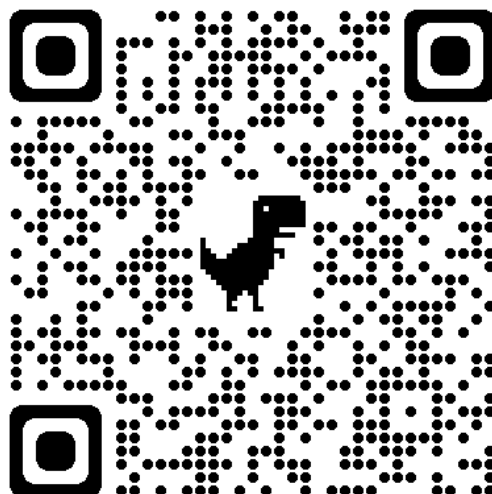
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering Surveying, Obaid Yaseen1, 1990. Engineering and cadastral surveying, Albakir Ziad, 2004.	Yes
Recommended Texts	Surveying for Civil and Mine Engineers, John Walker and Joseph L. Awange, 2018, Springer International Publishing Elementary surveying : an introduction to geomatics, Charles D. Ghilani, Paul R.Wolf., 13th ed.	No
Websites	https://guides.unitec.ac.nz/surveying/books	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				

NB 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.





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Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	FLUID MECHANICS		Module Delivery	
Module Type	CORE		Theory Lecture Lab Tutorial Practical Seminar	
Module Code	CE206			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	UGII	Semester of Delivery		4
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Dr. Basim M. Al-Zaidi		e-mail	basim.m.al-zaidi@utq.edu.iq
Module Leader's Acad. Title	Lecture	Module Leader's Qualification	Ph.D.	
Module Tutor	None		e-mail	None
Peer Reviewer Name	Dr. Abaas J. Ismaeel	e-mail	a.ismaeel@utq.edu.iq	
Review Committee Approval	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	<ol style="list-style-type: none"> 1. To obtain a comprehensive understanding of basic fluid mechanics in the context of Civil Engineering applications; 2. Applying fundamental fluid mechanics theory to solve well-defined problems in fluid statics and fluid dynamics; 3. Develop students' ability to collect and analyze basic measurement data and present the findings in technical reports. 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>On successful completion of this module the learner will be able to:</p> <ol style="list-style-type: none"> 1. Understand the principles of fluid mechanics, use the principles of Fluid Mechanics to solve engineering problems; 2. demonstrate a comprehensive understanding of the fundamental properties of a fluid; 3. understand and apply concepts of hydrostatic pressure to problems on surfaces submerged in fluids; 4. understand the basic principles of Buoyancy, Flotation, and Stability of bodies in fluid; 5. understand of principles of the acceleration of fluid masses; 6. apply the Bernoulli equation, the continuity equation and the steady flow energy equation to fluid flow systems; 7. understand the principals of flow rates and velocity measurement; 8. apply the momentum equation to a control volume to determine the forces associated with a fluid flow; 9. apply the similitude concept and set up the relation between a model and a prototype; 10. analyze and quantify the major and minor head losses associated with fluid flow in pipes and piping networks; 11. ability to determine pressure drops for pipe systems and choose appropriate pumps and turbines depending on the application; 12. describe the principles of motion for fluids in Open channel; 13. describe and understand the unsteady flow and water hammer phenomenon; 14. understanding the basic of Boundary-Layer Flow; 15. an ability to design and conduct experiments, as well as to analyze and interpret data, and use laboratory equipment to generate data. 		
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p><u>Part I – Fluid Statics</u></p> <p>Fluid Properties [12 hrs]</p> <p>Fluid Statics- Pressure, Pressure Measurement (Manometry) [12 hrs]</p> <p>Hydrostatic Force on Plane Surfaces [12hr]</p> <p>Hydrostatic Force Curved Surfaces [12 hrs]</p>		

	Buoyancy, Flotation, and Stability [12 hrs] Acceleration of Fluid Masses [12 hrs] Midterm exam - [2 hr] <u>Part II – Fluid in Motion</u> Kinematics of Fluid Motion [12 hrs] Impulse-Momentum Principle [12 hrs] Similitude and Dimensional Analysis [12 hrs] Flow of Real Fluid [12 hrs] Pumps and Turbine [12 hrs] Unsteady Flow- Phenomenon of Water Hammer [6 hrs] Open-Channel flow [12 hr] Boundary-Layer Flow [6 hr]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The assessment strategy is designed to provide students with the opportunity to demonstrate understanding of scientific principles, methodologies and mathematics methods as well as the ability to describe particular systems and processes in the final examination.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	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	4	10% (10)	4, 6, 10, 12	LO #2, 3, 8 and 10
	Assignments	2	10% (10)	2, 11	LO # 3, 4, 6 and 12
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 6, 8 and 13
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	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 - Fluid Properties
Week 2	Fluid Statics- Hydrostatic Pressure, Fluid Pressure Measurement (Manometry)
Week 3	Hydrostatic Pressure Force on Plane and Curved Surfaces
Week 4	Buoyancy, Flotation, and Stability
Week 5	Acceleration of Fluid Masses – Uniform Linear Acceleration, Uniform rotation about a vertical axis (angular acceleration)
Week 6	Kinematics of Fluid Motion, Principles of Mass Conservation (Continuity equation) and Momentum equation, Bernoulli Equation, Energy equation, Application of Continuity, energy equation / Bernoulli equation.
Week 7	Mid-term Exam
Week 8	Impulse-Momentum Principle
Week 9	Similitude and Dimensional Analysis
Week 10	Flow of Real Fluid- Fluid Flow in Conduits, Classification of Fluid Flow, Flow Measurement, Major and Minor Losses, Pipelines (Pipes in Series, Pipes in Parallel Network).
Week 11	Fluid Machinery - Pumps and Turbines
Week 12	Unsteady Flow- Phenomenon of Water Hammer
Week 13	Open-Channel flow – Momentum equation, Hydraulic Jump, Specific Energy and Transitions
Week 14	Boundary-Layer Flow- An introduction
Week 15	Preparatory Week
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Measuring of Fluid Properties: Density of Liquids, Viscosity, Capillarity.
Week 2	Lab 2: Hydrostatic Pressure Measurement: Gage pressure Calibration, Manometry, Hydrostatic Force on Surface, Pascal's Principle law.

Week 3	Lab 3: Buoyancy, Flotation, and Stability: Archimedes' Principle, Metacentric Height.
Week 4	Lab 4: Free and Forced Vortices
Week 5	Lab 5: Fluid Flow: Bernoulli Theorem Demonstration, Impact of a Jet, Flow Meter Measurement, Orifice and Free Jet Flow.
Week 6	Lab 6: Flow through an Orifice
Week 7	Lab 7: Reynolds Number Experiment
Week 8	Lab 8: Major Energy Losses in Pipe Flow, Pipe Friction Loss in a Smooth Pipe
Week 9	Lab 9: Minor Losses in Pipes, i.e., Energy Losses in Bends.
Week 10	Lab 10: Pump in Series and Parallel, Centrifugal Pump Characteristics
Week 11	Lab 11: Water Hammer
Week 12	Lab 12: Open-channel Flow Properties: Hydraulic Jump, Gradually-varied Flow
Week 13	Lab 13: Open-channel flow: Flow over Weir
Week 14	Lab 14: Measurement of Open Channel Flow Rate using a Sharp-Crested Weir.
Week 15	Preparatory Week
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fluid Mechanics with Engineering Applications by Joseph B. Franzini & E. John Finnemore	Yes
Recommended Texts	Fundamentals of Fluid Mechanics, 7 Eddition, by Muson, B.R, Okllshi, T.H., Huebsch, W.W., and Rothmayer, A. P., 2013.	No
Websites		

APPENDIX:

GRADING SCHEME

مخطط الدرجات

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

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

Note:

NB 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.





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Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	MECHANICS OF MATERIALS		Module Delivery
Module Type	CORE		Theory Lecture Tutorial
Module Code	CE205		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Ghanim M. Kamil	e-mail	ghanim.kamil@utq.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name	Dr. Ali A. Khamees	e-mail	ali-almalki@utq.edu.iq
Review Committee Approval	01/06/2023	Version Number	1.0

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CE101	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To review types and classification of beams as a structural members.2. To establish the shear and bending moment diagram of beams.3. To provide a useful means to determine the largest shear and moment in a member, and specify where the maximums occur.4. To develop a method for finding the shear stress in a beam having a prismatic cross section and made from homogeneous material that behaves in a linear-elastic manner.5. To determine the bending stresses of symmetrical sections of homogenous material behaves in a linear-elastic manner.6. To determine the bending stresses of symmetrical sections of composite sections.7. To develop a method for finding the shear stress in a beam having a prismatic cross section and made from homogeneous material that behaves in a linear-elastic manner.8. To discuss the concept of shear flow, along with shear stress, for beams and thin-walled members.9. To review an analysis of stress developed in beams due to axial and lateral loads.10. To discuss various methods for determining the deflection and slope at specific points on beams.11. To discuss the behavior of columns with a general discussion of buckling, and determination of the axial load needed to buckle of different supports conditions.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Demonstrate an understanding of drawing shear and bending diagrams through different ways.2. Demonstrate an understanding of the concepts of bending stresses and shear stresses for homogenous, isotropic materials of beams and for composite beams.3. Demonstrate an understanding of finding the deflection in beams.4. Apply the above understanding to the designs and analysis of structural members based on strength and deformation criteria.5. Demonstrate an understanding of buckling in columns.6. Demonstrate an understanding of the assumptions and limitations of the theories used in strength of materials.7. Demonstrate competence in problem identification, formulation and

solution, and critical thinking.

Indicative content includes the following.

Shear and moment in beams

- Introduction, supports and loads.
- Shear - moment equations.
- Shear-moment diagrams.
- Sign convention.
- Area method for drawing shear-moment diagrams for distributed loading and concentrated loads.

Stresses in beams

- Bending stresses
 - Simplifying assumptions
 - Compatibility
 - Equilibrium
 - flexural formula
 - Section modulus.
- Composite beams
 - Introduction
 - Flexural formula for composite beams
- Shear stresses in beams
 - Analysis of flexure action
 - Horizontal shear stress
 - Vertical shear stress
 - Limitation of shear stress formula
 - Rectangular and wide flange sections.
 - Design of flexure and shear.
 - Design of fasteners of built -up beams.

Stresses due to combined loading

Combined axial load and lateral loads

Indicative Contents

المحتويات الإرشادية

Deflection of beams

- Introduction.
- Double integration method:
 - Differential equation of an elastic curve
 - Double integration of the differential equation
 - Double integration using bracket function
- Moment area method
 - Moment area theorems
 - Bending moment diagrams by parts
 - Application of the moment area method

Columns

- Introduction
- Critical load
 - Definition of critical load
 - Euler's formula
 - Discussion of critical load

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

1. Lectures: fundamental theories will be presented, followed by examples to illustrate how the theories can be applied to solving relevant engineering problems.
2. Tutorials & consultations will be used to help reinforce the understanding of the fundamentals, practice problem solving skills, and answer questions related to assignments and the different assessments. Throughout, students are encouraged to participate effectively in the different activities to refine, expand their critical thinking skills and reinforce learning.

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	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	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	2	10% (10)	5, 10	LO #1, 2, 3,4 and 7
	Assignments	2	20% (20)	6, 12	LO # 1,2 , 4, 5 ,6 and 7
	Participation	1	10% (10)	Continuous	
Summative assessment	Midterm Exam	1.5hrs	10% (10)	8	LO # 1,2, 4, 6, and 7
	Final Exam	3hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction, beams classification, supports and loads, internal forces of beams
Week 2	Shear -moment equations
Week 3	Moment diagrams by equations
Week 4	Moment diagrams by area method
Week 5	Stresses in beams, bending stresses
Week 6	Composite beams
Week 7	Shear stresses
Week 8	Mid-term Exam+ Combined axial load and lateral loads
Week 9	Deflection of beams: Governing differential equation for deflection of elastic beams
Week 10	Double integration method
Week 11	Double integration using bracket function
Week 12	Moment area method
Week 13	Columns: Nature of the beam column problems

Week 14	Euler buckling load
Week 15	Preparatory Week
Week 16	Final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Mechanics of materials, R.C. Hibbeler, McGraw-Hill Education	Yes
Recommended Texts	Mechanics of Materials, Andrew Pytel & Jaan Kiusalaas 2 nd edition, Cengage Learning	No
Websites		

APPENDIX:

GRADING SCHEME مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

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MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	STRENGTH OF MATERIALS		Module Delivery
Module Type	CORE		Theory Lecture Tutorial
Module Code	CE201		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGII	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Ghanim M. Kamil	e-mail	ghanim.kamil@utq.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name	Dr Ali A. Khamees	e-mail	ali-almalki@utq.edu.iq
Review Committee Approval	01/06/2023	Version Number	1.0

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CE101	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To review some important principles of statics and use them to determine the internal resultant forces in the solid body.2. To introduce and understand the concept of normal and shear stresses in axial members.3. To define the quantities of normal and shear strains of deformable bodies and show how they are determined for various problems.4. To introduce and discuss the characteristics of the strain- stress diagram of commonly materials used for structural members, such as steel.5. To discuss how to determine the axial deformation and thermal strain of the axial members.6. To develop a method to solve some problems that are indeterminate structures.7. To introduce and understand stresses of circular shafts subjected to problem solving skills and understanding the concept of stress and strain in solid materials through the application of techniques.8. To develop the plane stress equations of elements of structural members subjected to various loading and determine the principal stresses, and show how to construct the Mohr's circle and use it to determine the transformed stresses of elements any rotation axis.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Demonstrate an understanding of the concepts of stress and strain, and the stress-strain relationships for homogenous, isotropic materials of axial members.2. Demonstrate an understanding of the relationships between loads, member forces and deformations and material stresses and strains in structural members under axial loading, torsion and thin-walled pressure vessels.3. Demonstrate an understanding of the thermal strain effects and solving some indeterminate structures problems.4. Apply the above understanding to the designs and analysis of structural members based on strength and deformation criteria.5. Demonstrate an understanding of the assumptions and limitations of the theories used in strength of materials.6. Demonstrate competence in problem identification, formulation and solution, and critical thinking.

<p style="text-align: center;">Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Fundamental principles of mechanics & Stresses</u></p> <ul style="list-style-type: none"> • Condition of equilibrium. • Concept of stresses. • Stresses due to axial forces. • Normal stresses. • Average shearing stresses. • Bearing stresses • Thin-walled pressure vessels. <p><u>Strain & Mechanical properties</u></p> <ul style="list-style-type: none"> • Definitions. • Stress-strain diagrams. • Hook's law. • Poisson's ratio. • Linear relation between E, G and ν. • Thermal strain. • Indeterminate problems. <p><u>Torsion</u></p> <ul style="list-style-type: none"> • The torsion formula for the solid circular shaft • Design of circular member in torsion. • Angle of twist circular member in torsion. • Torsion for Thin-walled hollow section. • Torsion for solid non-circular sections. <p><u>Transformation of stress and strain</u></p> <ul style="list-style-type: none"> • Equations for the transformation of plane stresses. • Principal stresses. • Mohr's circle of stresses
	<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>
<p>Strategies</p>	<p>1. Lectures: fundamental theories will be presented, followed by examples to illustrate how the theories can be applied to solving relevant</p>

	<p>engineering problems.</p> <p>2. Tutorials & consultations will be used to help reinforce the understanding of the fundamentals, practice problem solving skills, and answer questions related to assignments and the different assessments. Throughout, students are encouraged to participate effectively in the different activities to refine, expand their critical thinking skills and reinforce learning.</p>
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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	6
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					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	5, 10	LO #1, 2, 3 and 4
	Assignments	2	10% (10)	4 and 12	LO # 1, 2, 3 and 6
	Participation	1	10% (10)	Continuous	
Summative assessment	Midterm Exam	1.5hrs	10% (10)	8	LO # 1,2,3, 4 and 6
	Final Exam	3hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction – equilibrium of a deformable body
Week 2	Concept of stress, Average Normal Stress, Average shear stress in an axial member,

Week 3	Allowable stress design, thin walled pressure vessels
Week 4	Mechanical properties of materials, stress-strain diagram, Poisson's ratio, shear strain,
Week 5	Axial load member, elastic deformation of an axially loaded member,
Week 6	Statically indeterminate axial members
Week 7	Thermal stresses
Week 8	Mid-term Exam + Torsional deformation of circular members, torsion formula
Week 9	Angle of twist, statically indeterminate of torque-loaded members.
Week 10	Solid noncircular shafts
Week 11	Thin-walled tubes having closed cross sections
Week 12	Plane stress transformation, general equations of plane stress transformation
Week 13	Principal stresses and maximum in-plane shear stress
Week 14	Mohr's circle-plane stress
Week 15	Preparatory Week
Week 16	Final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Mechanics of materials, R.C. Hibbeler, McGraw-Hill	Yes

	Education	
Recommended Texts	Mechanics of Materials, Andrew Pytel & Jaan Kiusalaas 2 nd edition, Cengage Learning	Yes
Websites		

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.





Ministry of Higher Education and
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College of Engineering
Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	STRUCTURAL DRAWING		Module Delivery
Module Type	CORE	<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input checked="" type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	CE207		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery	2
Administering Department	ECTS	College	Engineering College
Module Leader	Asst. Prof. Dr. Laith Hady Al-ossmi	e-mail	laith-h@utq.edu.iq
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Asst. Prof. Dr. Laith Hady Al-ossmi	e-mail	laith-h@utq.edu.iq
Peer Reviewer Name	Dr. Wassen Qassim	e-mail	
Review Committee Approval	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	<ol style="list-style-type: none"> 1. Understand the principles of orthographic projection and create orthographic projections of construction objects. 2. Apply appropriate dimensioning techniques and annotate civil engineering drawings accurately. 3. Demonstrate an understanding of geometric tolerancing and its application in civil engineering drawings. 4. Recognize and apply relevant industry standards and conventions in engineering drawing practices. 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. To develop a knowledge of both manual and skills generated construction drawing. 2. To create and edit a variety of civil engineering drawings. 3. Communicate effectively in a modern technical engineering. 4. Construct and present quality engineering drawings in a well drafted manner. 5. Produce detailed Engineering drawings using 2D and 3D drafted skills. 		
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p><u>Part A – Sketching (50 hr)</u></p> <ol style="list-style-type: none"> 1. Introduction to Construction Drawing 2. Importance and purpose of construction drawing in civile works 3. Role of construction drawing in the design and manufacturing process of civil engineering 4. Paper size, Lettering & title blocks 5. Drawing Tools and Equipment 6. Selection and use of drawing instruments. 7. Types of construction Sections and Elevations. 8. 2 and Dimensions views. 		

	<p><u>Part B- Orthographic Projection (10hr)</u></p> <ol style="list-style-type: none"> 1- Principles of Construction Sections. 2- Creating and Interpreting Constructional Plans. 3- Creating Section details to show internal Features. 4- Sectional views in key Constructional Details. <p><u>Part B –3D Constructional Details (15hr)</u></p> <ol style="list-style-type: none"> 5- Introduction to 3D Constructional Details 6- Fundamental Principles and Construction of Isometric Drawings 7- Applying relevant Standards and Details in civil engineering. 8- Applying constructional plans.
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>The main strategy that will be adopted in delivering this module is:</p> <ol style="list-style-type: none"> 1-Lectures: Instructors typically provide lectures to introduce and explain the fundamental concepts, principles, and techniques of Construction drawing. This includes topics such as orthographic projection, dimensioning, and sectioning. Lectures can be supplemented with visual aids, such as slides or handouts, to enhance understanding. 2-Hands-on Practice: Construction drawing is a practical skill, and students need ample opportunities for hands-on practice. Instructors typically assign drawing exercises and projects that involve creating various types of drawings, including 2D and 3D representations. Students can work individually or in groups to apply the learned concepts and develop their drawing skills. 3-Assignments and Homework: Assignments and homework are an essential part of the learning process. They provide students with opportunities to reinforce their understanding, apply concepts to real-world scenarios, and practice drawing techniques. Assignments may involve drawing specific objects, interpreting technical drawings, or solving drawing-related problems. 5-Assessments and Examinations: Regular assessments, quizzes, or examinations are conducted to evaluate students' comprehension of the subject matter. These assessments test their ability to interpret civil drawings, apply standards, and produce accurate and detailed construction drawings.

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 أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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	
	Report	1	10% (10)	13	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	Introduction to Construction drawing, standards information, paper size and lines types, etc.
Week 2	Introduction to geometrical constructions in civil drawing.
Week 3	Constructions essential principles.
Week 4	Geometrical constructions practices.
Week 5	Theory of projections and orthogonal projection in civil drawing.
Week 6	Applying foundations grid and reading plans.
Week 7	Introduction to Isometric projection in civil engineering
Week 8	Isometric details in civil engineering
Week 9	Elevations and Sections details
Week 10	Mid-term Exam
Week 11	Introduction to 3D projection in Civil engineering

Week 12	3D and oblique projections in Civil details
Week 13	Understanding and applying relevant standards, such as EXONO and PRESPECTIVE.
Week 14	Applying fundamental details in Civil engineering.
Week 15	Preparatory Week before the final Exam.
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	None.
Week 2	None.
Week 3	None.
Week 4	None.
Week 5	None.
Week 6	None.
Week 7	None.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	"Engineering Graphics: Tools for the Mind" by Gary R. Bertoline, Eric N. Wiebe, and Nathan W. Hartman.	No
Recommended Texts	<ol style="list-style-type: none"> Giesecke, F.E., et al. Technical Drawing with Engineering Graphics. Pearson, 2018. Jensen, C.R., Hesel, J.D. Engineering Drawing and Design. Cengage Learning, 2017. 	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/Engineering	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

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MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	CONCRETE TECHNOLOGY		Module Delivery
Module Type	CORE		Theory Lecture Lab Tutorial
Module Code	CE203		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	2	Semester of Delivery	
Administering Department		College	
Module Leader	Dr. Hayder M. Oleiwi	e-mail	hayder.oleiwi@utq.edu.iq
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name	Yahya R. Atewi	e-mail	yahya.resan@utq.edu.iq
Review Committee Approval	20/06/2023	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

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. Introducing students to the most widely used structural material in the field of civil engineering, as it is the ideal choice when a material with high resistance is required, characterized by good performance, high durability, and fire resistance.2. Provide students with the necessary engineering concepts and experiences about the properties and behavior of concrete, as well as the influencing factors that have a major role in determining the quality of concrete produced in various construction fields.3. Acquisition of skills for conducting laboratory tests for concrete and its components according to Iraqi and international specifications
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Understanding of hydration of cement as well as important physical and chemical properties of the hydration products.2. Describe the physical & mechanical properties of aggregates.3. Production and quality control of concrete at its fresh and hardened state, describe and carry out tests relevant to the use of concrete on site.4. Explain factors affecting strength of concrete.5. Design the concrete mixtures using British and American methods.6. Study factors affecting durability of concrete
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following:</p> <p>Portland cement: Manufacture of Portland cement, Chemical composition of Portland cement, Hydration of cement, Calcium silicate hydrates, Tricalcium aluminate hydrate and the action of gypsum, Setting, False set, Fineness of cement, Structure of hydrated cement, Volume of products of hydration, Capillary pores, Gel pores, Water held in hydrated cement paste, Heat of hydration of cement.</p> <p>Types of Cement: Ordinary Portland cement, Rapid-hardening Portland cement, Special very rapid-hardening Portland cements, Low heat Portland cement, Sulfate-resisting cement, White cement and pigments, Portland blastfurnace cement, Pozzolanic cements, Other cements, High-alumina cement.</p> <p>Properties of aggregate: General classification of aggregates, Sampling, Particle shape and texture, Strength of aggregate, impact and crushing value of aggregate, Specific gravity, Bulk density, Porosity and absorption of aggregate, Moisture content of aggregate, Deleterious substances in aggregate, Alkali-silica reaction, Sieve analysis, Fineness modulus, Grading requirements, Gap-graded aggregate, Maximum aggregate size.</p>

	<p>Fresh concrete: Quality of mixing water, workability and measurement (slump test), Factors affecting workability, Effect of time and temperature on workability, Segregation, Bleeding, the mixing of concrete, Concrete mixers, Hand mixing, Ready-mixed concrete, Pumped concrete, Vibration of concrete, Internal vibrators, External vibrators, Vibrating tables, Other vibrators, concreting in hot weather.</p> <p>Strength of concrete: Nature of concrete, Types of strength (compressive, tensile, flexural), Factors affecting strength, Curing of concrete, Bond with reinforcement, Quality of water.</p> <p>Mix Design of Concrete: British and American methods.</p> <p>Durability of concrete: Effects of carbonation, Sulfate attack on concrete, Effects of sea water on concrete, Chloride attack, corrosion of steel in concrete.</p> <p>Elasticity, Creep and Shrinkage.</p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
Strategies	The educational material is delivered, encourage students to discussion, and laboratory tests learning.

<p>Student Workload (SWL) الحمل الدراسي للطالب</p>			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	110	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	90	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

<p>Module Evaluation تقييم المادة الدراسية</p>					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 11	LO #1-4
	Assignments/ In-class discussions	2	10% (10)	4, 10	LO # 1-4
	Laboratory	1	10% (10)	Continuous	
	Report/ homework	1	10% (10)	13	LO # 5
Summative assessment	Midterm Exam	1.5hr	10% (10)	7	LO # 1-3
	Final Exam	3hr	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
Week 2	Portland cement, Manufacturing and Chemical composition
Week 3	Cement hydration, Properties (fineness, heat of hydration, setting, soundness), Microstructure of cement paste
Week 4	Types of Cement (Ordinary PC, Rapid hardening PC, Low-heat PC, Sulfate-resisting PC, Pozzolanic PC, White PC, Other types of cements)
Week 5	Aggregate (Classification, Properties (shape, texture, density), Moisture content, Deleterious substances)
Week 6	Aggregate (Sieve analysis, Practical grading, Gap-grading)
Week 7	Fresh concrete (Consistency, Workability & tests, Segregation & bleeding)
Week 8	Mid Term Exam
Week 9	Fresh concrete (Mixing of concrete, Consolidation of concrete, Pumping of concrete, Hot weather concreting)
Week 10	Strength of Concrete (Nature of concrete, Types of strength (compressive, tensile, flexural), Factors affecting strength, Curing of concrete, Bond with reinforcement, Quality of water)
Week 11	Mix Design of Concrete, British method
Week 12	Mix Design of Concrete, American method
Week 13	Durability of Concrete (Permeability of concrete, Effect of sea water, Effect of sulfate, corrosion of steel)
Week 14	Durability of Concrete (corrosion of steel in concrete)
Week 15	Elasticity, Creep and Shrinkage
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Normal consistency of cement.
Week 2	Initial and final setting times of cement
Week 3	Compressive strength of cement

Week 4	Specific gravity and absorption of fine aggregate
Week 5	Specific gravity and absorption of coarse aggregate.
Week 6	Sieve analysis of fine aggregate and coarse aggregate
Week 7	Flakiness index of coarse aggregate
Week 8	Elongation index of coarse aggregate
Week 9	Aggregate Crushing value
Week 10	Aggregate Impact Value
Week 11	Unit Weight of Aggregate
Week 12	Workability of fresh concrete (slump test)
Week 13	Compressive strength and splitting tensile strength of concrete
Week 14	Flexural Strength of hardened concrete
Week 15	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Properties of concrete, A. M. Neville, fifth edition, 2011	Yes
Recommended Texts	1. Concrete technology, theory and practice, M.S. SHETTY, S. CHAND & COMPANY LTD, 2005 2. Michael S. Mamlouk and John P. Zaniewski, Materials for Civil and Construction Engineers, 3 rd edition, 2011	Available Online
Websites	www. concrete.org	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded

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

Note:

NB 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.





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MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	BUILDINGS CONSTRUCTION		Module Delivery	
Module Type	CORE		✓ Theory Lecture Lab ✓ Tutorial Practical Seminar	
Module Code	CE204			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	2	Semester of Delivery	3	
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Dr Ali A. Khamees		e-mail	ali-almalki@utq.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	None		e-mail	None
Peer Reviewer Name	Dr. Wasan Q. Fayyadh	e-mail	wasan.q.fayyadh@utq.edu.iq	
Review Committee Approval	19/6/2023	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	<ol style="list-style-type: none"> 1- Identifying the stages of building construction and developing the idea of the project, its objectives and the extent of the need for it 2- To understand the earthworks, including earthen excavations and earthworks, and then carry out the foundation works 3- Knowing the building units, their types, how to manufacture them, then building with these units and the different construction methods 4- Learn how to use moulds in construction work and develop them to suit the development of concrete uses and pour them with specific geometric shapes and dimensions, and know what moulds need from scaffolding and carriers 5- Study the structural elements starting from beams, girders and columns to floors and roofs, then identify the arches, lintels and sills 6- Finishing of walls and ceilings and use of damp proofing 7- Construction of doors, windows and means of moving between levels 8- To learn details about the construction of fireplaces and chimneys 9- Identify the joints in buildings, their types and details 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1- Identifying the stages of building construction, the project's aims 2- Understand earthworks, such as earthen excavations and earthworks, and then do foundation work 3. Becoming acquainted with the numerous types of building units and their manufacturing methods, as well as various construction techniques 4- Identifying the use of moulds in the construction works, as well as scaffolding and carriers 5. Examine the structural elements, starting with the beams, girders, and columns 6- Identifying the floors, roofs, arches, lintels, and sills. 7- Applications of wall and ceiling finishing, as well as damp proofing 8- Knowledge of buildings doors, windows, and means of travelling between levels 9- Understand more about the fireplace and chimney details in the building. 10- Identify the types and characteristics of building joints. 		
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p><u>Part A - Project idea and site preparation</u></p> <p>The idea of the project requires defining the objective of the project clearly by specifying the work site primarily as well as the necessary complementary services and others within the capabilities of the project. Then prepare the site and carry out all the necessary excavations and earthworks.</p>		

	<p><u>Part B - The structural frame of the buildings</u></p> <p>Studying all structural elements and their details, selecting the type of foundation based on soil investigations, reading plans, knowledge of construction methods and types of structural frames, learning and mastering implementation methods, avoiding construction errors in implementation, knowing methods of maintaining buildings and comparing these methods.</p> <p><u>Part C - finishings</u></p> <p>This part includes the methods used in finishing ceilings, walls and floors. Choosing the appropriate type of finish and selecting the necessary treatment makes the surfaces smooth and glossy, free of cracks, hygienic, and has good resistance to conditions of use.</p>
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>Providing the most important basic information needed by the civil engineering student in the subject of building construction and preparing to learn much information that is related to his future studies and his practice of the profession after that.</p> <p>The student will learn the sequence of construction stages, starting from planning, then excavations, foundation works, floors, and so on, as mentioned in the arrangement of lectures, with an emphasis on the structural issues that will not be discussed in future academic stages.</p>
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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	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	15% (15)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.				
	Report	1	05% (05)	13	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	General Introduction to Buildings, Earthworks
Week 2	Footing and Foundations, Piles
Week 3	Brickwork and Blockwork
Week 4	Masonry Works
Week 5	Forms and Scaffoldings
Week 6	Beams, Girders and Columns
Week 7	Mid-term Exam
Week 8	Floors and Roofs
Week 9	Arches, Lintels and Sills
Week 10	Damp Proofing, Finishing of Walls and Ceilings
Week 11	Doors and Windows
Week 12	Means of Moving Between Levels
Week 13	Fire Places and Chimneys
Week 14	Joints in Buildings
Week 15	Preparatory Week
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Buildings Construction, Zuhair Saco and Artin Levon , Baghdad University Printing Press	Yes
Recommended Texts	Building Installation: Bearing Walls and Their Architectural Details, Anees J. Salman, Technology University, Iraqi Technical Printing Co. Ltd. 1988	Yes
Websites		

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				

NB 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.





Ministry of Higher Education and
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College of Engineering
Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	THEORY OF STRUCTURES		Module Delivery	
Module Type	CORE		Lecture & Tutorial	
Module Code	CE301			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGIII	Semester of Delivery		5
Administering Department	Civil Engineering	College	Collage of Engineering	
Module Leader	Dr. Ali A. Sultan		e-mail	ali-abd@utq.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.	
Module Tutor	None		e-mail	None
Peer Reviewer Name	Dr. Ali k. ALASEDE	e-mail	alazharco.2005@utq.edu.iq	
Review Committee Approval	18/06/2023	Version Number	1.0	

Relation With Other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	Mechanics of Materials		Semester	4
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To understand the types of structural buildings and structural systems such as building frames, trusses, bridges, etc.2. To understand and recognize the types structural elements such as beams, columns, connections and what kind of stress are anticipated in each element.3. Classifying structures into determinate and indeterminate structures and what kind of structural analysis approach to be used for each type.4. Introduces the different types of structural loadings the buildings may subjected to during their service life such as dead loads and live loads and investigating the stability of structures.5. To introduce the structural analysis methods for different structural systems and elements.6. Introduces the principles and method of analysis of influence lines theory,7. Introduces the principles and method of deformation calculations in different types of structures due to loading and other secondary effects such as temperature change and fabrication errors.8. Introducing and discussing the possibility of using a simple analysis software such as RISA-2D in analyzing different types of structures.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Recognizes how structures are to be classified based on the determinacy and stability output.2. Recognizes how different types of and live loading are to be applied and distributed on the structural systems.3. Identifying how different types of structural systems such as buildings frames, beams, trusses are to be analyzed to determine the reactions and internal forces developed in each type of elements.4. Explain how the position of moving loads such as moving vehicles affects the internal forces and stresses developed in structural elements such as girders and beams.5. Explain how deformations in different structural systems such as beams, frames, and trusses are to be calculated using virtual work theory.

	<p>6. Analysis of deformation of structures due to secondary effects such as temperature change and lack-of-fit effects.</p> <p>7. Students will be able to accurately and simply analyze most types of structures such as multistory buildings, trusses, warehouse etc using a simple analysis software under different types of loadings such as self-weight, and live loading such as wind loading and other live loads.</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<p>The indicative contents of the module are as follows:</p> <ul style="list-style-type: none"> • introduction to structural elements, systems, supports and loadings • stability and determinacy of structures • analysis of determinate structures such as beams, frames and trusses • determination of reactions, internal forces, and deformations. • Studying and analyzing the effects of moving loading on bridge girders. • Simulation and analysis of structures using a simple software such as RISA-2D software. <p>The module will be taught using a combination of lectures, and tutorials. The lectures will cover the basic principles of structural analysis. The tutorials will provide students with the opportunity to practice the skills they have learned in the lectures.</p> <p>The module will be assessed by a combination of coursework and an exam. The coursework will consist of a series of analysis problems. The exam will cover the material covered in the lectures and tutorials.</p> <p>The module is designed for students who are interested in a career in civil engineering, structural engineering, or architectural engineering. The skills learned in this module will be essential for the analysis of structures.</p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>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 involving some homework and assignments activities that are interesting to the students.</p>

<p>Student Workload (SWL) الحمل الدراسي للطالب</p>			
<p>Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل</p>	<p>63</p>	<p>Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً</p>	<p>4.5</p>

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4.5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	15% (15)	5, 10	LO #1 through #6
	Assignments	2	10% (10)	2, 12	LO #1 through #6
	Projects	1	15% (15)	13	LO #1 through #7
	Report	0	0% (0)		
Summative assessment	Midterm Exam	2 hr	10% (10)	10	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	Introduction – types of supports, structural elements, and loadings
Week 2	Investigating the stability and determinacy of structures
Week 3	Analysis of statically determinate beams
Week 4	Analysis of statically determinate frames
Week 5	Analysis of statically determinate frames
Week 6	Analysis of statically determinate trusses
Week 7	Analysis of statically determinate trusses
Week 8	Influence lines of statically determinate structures
Week 9	Influence lines of statically determinate structures
Week 10	Applications of Influence lines + Midterm exam
Week 11	Absolute maximum moments and shear developed in bridge girders
Week 12	Analysis of deformations of rigid structures (beams and frames)
Week 13	Analysis of deformations of trusses due to load and secondary effects
Week 14	Introduction to RISA software simulation and analysis of structures.
Week 15	Preparatory Week

Week 16	Final Exam
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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	Structural Analysis: 8 th edition or newer version By: R. C. Hibbeler. Copyright Year: 2012 Published by Pearson Prentice Hall, Pearson Education, Inc.	Older version is available
Recommended Texts	Fundamentals of Structural Analysis: 5 th Edition or newer By: Keeneth M. Leet et al. Copyright Year: 2018. Published by: McGraw-Hill Education.	No
Websites	RISA Homepage	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.





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Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	REINFORCED CONCRETE FUNDAMENTALS	Module Delivery	
Module Type	CORE	Lecture & Tutorial	
Module Code	CE302		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	5
Administering Department	Civil Engineering	College	Collage of Engineering
Module Leader	Dr. Ali k. ALASEDE	e-mail	alazharco.2005@utq.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name	Dr. Ali A. SULTAN	e-mail	ali-abd@utq.edu.iq
Review Committee Approval		Version Number	1.0

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mechanics of Materials and concrete technology	Semester	5
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To understand the analysis and designs of structural buildings and structural systems such as building frames, , beams, etc.2. To understand and identify structural elements such as beams, columns, and joints and to determine the expected stress and tensile strength in each element.3. The possibility of determining the type of failure for all members of the origin of beams.4. The possibility of studying the bending of concrete beams, shear and torsion5. Presents the different types of structural loads that buildings may be exposed to during their service life, such as dead loads and live loads, and checks the stability of the structures when designing them.6. It introduces the principles and method for calculating deformation in various types of structures due to loading and other influences7. Studying the role of concrete technology (aggregate with quality, cement, water and iron) the properties of these materials and their impact after hardening8. Studying concrete thresholds single and double reinforcement and knowing the lowest possible amount of steel9. A study of the types of concrete beams(T,L) and the method of their reinforcement10. Study of shear stresses for beams
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Knowledge of live and dead loads affecting the structure and other loads such as wind and others2. Economical design of concrete structures by knowing the upper and lowerACI code values3. Analysis of deformation of beams.4. Studying reinforcing steel and its effect on concrete beams and determining the longitudinal or transverse steel5. Study of reinforced concrete based on ACI code6. A study of concrete design methods using the WORKING stress method and the strength method

<p>Indicative Contents المحتويات الإرشادية</p>	<p>The indicative contents of the module are as follows:</p> <ul style="list-style-type: none"> • 1.INTRODUCTION REINFORCED CONCRETE STRUCTURES • MATERIALS AND PROPERTIES • Behavior of R.C. Beams under loading and working stress method • Design of rectangular beam by working method (WSD) • STRENGTH DESIGN AND ANALYSIS METHOD according to ACI Code • BEAM DESIGN METHODS AND REQUIREMENTS • ANALYSIS AND DESIGN OF SINGLY REINFORCED CONCRETE RECTANGULAR SECTIONS FOR FLEXURE • ANALYSIS OF DOUBL REINFORCED CONCRETE RECTANGULAR SECTIONS FOR FLEXURE • DESIGN OF DOUBL REINFORCED CONCRETE RECTANGULAR SECTIONS FOR FLEXURE • Flexural analysis and design of Irregular sec. • Flexural analysis and design of T-beam • Flexural analysis and design of L-beam • INTRODUCTION Shear strength of beam design of shear reinforcement • design of shear reinforcement • Introduction to torsion in beams • The module will be taught using a combination of lectures, and tutorials. The lectures will cover the basic principles of structural analysis. The tutorials will provide students with the opportunity to practice the skills they have learned in the lectures. <p>The module will be assessed by a combination of coursework and an exam. The coursework will consist of a series of analysis problems. The exam will cover the material covered in the lectures and tutorials.</p> <p>The module is designed for students who are interested in a career in civil engineering, structural engineering, or architectural engineering. The skills learned in this module will be essential for the analysis of structures.</p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>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</p>

	through classes, interactive tutorials and by involving some homework and assignments activities that are interesting to the students.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.3
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	2	15% (15)	5, 10	LO #1 through #6
	Assignments	2	10% (10)	2, 12	LO #1 through #6
	Projects / Lab.	1	15% (15)		
	Report	0	0% (0)		
Summative assessment	Midterm Exam	2 hr	10% (10)	10	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	1.INTRODUCTION REINFORCED CONCRETE STRUCTURES 2. MATERIALS AND PROPERTIES
Week 2	Behavior of R.C. Beams under loading and working stress method
Week 3	Design of rectangular beam by working method (WSD)
Week 4	1.STRENGTH DESIGN AND ANALYSIS METHOD according to ACI Code 2.BEAM DESIGN METHODS AND REQUIREMENTS
Week 5	ANALYSIS AND DESIGN OF SINGLY REINFORCED CONCRETE RECTANGULAR

SECTIONS FOR FLEXURE	
Week 6	ANALYSIS OF DOUBL REINFORCED CONCRETE RECTANGULAR SECTIONS FOR FLEXURE
Week 7	DESIGN OF DOUBL REINFORCED CONCRETE RECTANGULAR SECTIONS FOR FLEXURE
Week8	Flexural analysis and design of Irregular sec.
Week 9	Flexural analysis and design of T-beam
Week 10	Flexural analysis and design of L-beam
Week 11	INTRODUCTION Shear strength of beam design of shear reinforcement
Week 12	design of shear reinforcement
Week 13	Introduction to torsion in beams
Week 14	Preparatory Week
Week 15	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	1. Design of concrete structures Edition 14 , by Arthur H. Nilson, George Winter by McGraw-Hill Book Company. 2. Design of Reinforced Concrete Jack C. McCormac	Older version is available

	and Russell H. Brown Edition 9. Wiley . 3. ACI Code 318-14.	
Recommended Texts	1.Reinforced Concrete Design, 7th Edition, by Chu-Kia Wang and others, 2007, John Wiley & Sons, INC	No
Websites	RISA Homepage	

APPENDIX:

GRADING SCHEME مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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College of Engineering
Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	ENGINEERING & NUMERICAL ANALYSIS		Module Delivery	
Module Type	CORE		Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input checked="" type="checkbox"/> Practical <input type="checkbox"/> Seminar <input type="checkbox"/>	
Module Code	CE304			
ECTS Credits	8			
SWL (hr/sem)	200			
Module Level	1	Semester of Delivery		1
Administering Department	C	College	E	
Module Leader	Dr. Nesreen Kurdy Al-Obaidy		e-mail	Nesreen.kurdy@utq.edu.iq
Module Leader's Acad. Title	Professor		Module Leader's Qualification	Ph.D.
Module Tutor	None		e-mail	None
Peer Reviewer Name	Dr. Ressel R. Shakir		e-mail	Ressel R. Shakir @utq.edu.iq
Review Committee Approval	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	<ol style="list-style-type: none"> 1. To develop problem solving skills and understanding of many subjects in engineering mathematics and applications for civil engineering problems. 2. To model civil engineering problems as first, second and higher differential equations. 3. To solve ordinary and partial derivatives. 4. This course deals with the basic concept of Fourier Series. 5. To understand Laplace transforms and inverse Laplace transform problems 6. To model and analyze different engineering applications in Civil Engineering using numerical methods for solving differential equations and Integration, root finding and functions interpolation 7. To develop the student's ability to apply his or her numerical knowledge for solving the engineering applications in the field of civil engineering. 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Recognize how mathematics work for engineering applications. 2. List the various methods for solving ordinary and partial differential equation. 3. Modeling an engineering problem as a differential equation. 4. Solving Fourier series problems. 5. Identify the basic laws for Laplace and inverse Laplace transform. 6. Applying Laplace transform to solve a differential equation. 7. Recognize how numerical methods can solve complicated problems. 8. Understanding the types of numerical error. 9. Applying numerical methods for root findings. 10. Applying numerical methods to solve differential equations. 11. Applying numerical methods to determine an integral. 12. List the various methods for data interpolation. 		
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Engineering Analysis (56 hrs)</u> Differential equations, types; ordinary and partial. The order and degree of a differential equation, linear and nonlinear equations. Review of methods for solving 1 st ODEs. [7 hrs.]. Applications of 1 st ODEs. [14 hrs.]. Review of		

	<p>methods for solving 2nd and higher ODEs, Applications of 2nd and higher ODEs ODEs. [14 hrs.]. Fundamentals, odd and even functions, Fourier Series and half range problem [7 hrs.]. Basic concept of partial derivatives, solving partial derivatives [7 hrs.]. Laplace Transform definition, theorems, inverse of Laplace Transform, applying Laplace Transform to solve differential equations. [7 hrs.]</p> <p><u>Part B – Numerical Methods (46 hrs.)</u> Introduction to numerical analysis and error [4 hrs.] Root findings [7 hrs.] Methods of Solving Linear System of Equations [7 hrs.] Interpolation and Curve Fitting [14 hrs.] Numerical Integration [7 hrs.] Numerical Differentiation, Euler Method, Modified Euler Method, Runge Kutta Method, Finite Differences Method with Applications [7 hrs.].</p>
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>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.</p>
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	102	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	98	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	6.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	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	

	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, differential equations types; ordinary ODEs and partial PDEs. The order and degree of a differential equation, linear and nonlinear equations. Review of methods for solving 1 st ODES (separable variables, homogeneous, exact, linear and reducible)
Week 2	Application of 1 st order ODEs; falling object problems with and without air resistance, population growth and decay, and mixing tanks.
Week 3	Application of 1 st order ODEs; cooling and heating Newtons law, and leaking or draining of tanks (Torricelli's Law) stress and strain (Hook's Law), and orthogonal trajectories
Week 4	Review of methods for solving 2 nd , and higher ODEs (undetermined coefficient method, variation parameters method, reduction order method and Euler-Cauchy method).
Week 5	Application of 2 nd order ODEs; free, damped and forced vibrations suspension bridge or suspended wire, application of 1 st , 2 nd and higher order ODEs through deflection, rotation, moment, and shear of beam.
Week 6	Fourier Series, odd and even functions, half range, applications. Partial Differential Equations
Week 7	Laplace Transforms, Inverse Laplace Transforms, solving linear ODEs by Laplace Transform
Week 8	Mid-term Exam, introduction to numerical analysis and error
Week 9	Root findings, bracketing methods (Bisection and False Position) & Open Methods (Fixed Point Iteration Method, Newton-Raphson's Method, Secant Method).
Week 10	Methods of Solving Linear System of Equations (Gauss Elimination Method, Gauss-Jordan Method, L-U Factorization Method, Jacobi Iteration Method, Gauss-Seidel Iteration Method).
Week 11	Interpolation (Introduction, Lagrange Interpolation, Newton-Divided Difference Interpolation, Newton's Forward Difference Formula, Newton's Backward Difference Formula, Gauss Forward Formula).
Week 12	Gauss Forward Formula, curve fitting.
Week 13	Numerical Integration [Rectangle methods, Trapezoidal Rule and Simpson's Rule (One Third Rule and Three-Eight Rule)]
Week 14	Numerical Differentiation, Euler Method, Modified Euler Method, Runge Kutta Method, Finite Differences Method with Applications.
Week 15	Preparatory Week

Week 16	Final Exam
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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	1- Erwin Kreyszig, (2011), Advanced Engineering Mathematics, Book, 10th Edition. 2- McDonough, J.M., 2007. Lectures in Basic computational numerical analysis.	Yes
Recommended Texts	1- Paul Blanchard, Robert L. Devaney, and Glen R. Hall (2011) Differential Equations, Book, 4th Edition. 2- William E. Boyce and Richard C. DiPrima, (2001) Elementary Differential Equations and Boundary Value Problems, Book, 7th Edition. 3- Stephen L. Campbell and Richard Haberman, Introduction to Differential Equations with Dynamical Systems 4- Numerical Methods by Robert W. Hornbeck	No
Websites	https://www.bau.edu.jo/UserPortal/UserProfile/PostsAttach/59003_3812_1.pdf https://uknowledge.uky.edu/cgi/viewcontent.cgi?article=1000&context=math_textbooks	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.





Ministry of Higher Education and
Scientific Research - Iraq
University of Thi-Qar
College of Engineering
Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	WATER RESOURCES ENGINEERING		Module Delivery
Module Type	CORE		Class Lecture Classroom Lecture (online) Tutorial
Module Code	CE305		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	3	Semester of Delivery	5
Administering Department	Civil	College	Engineering
Module Leader	Dr. Abaas J. Ismaeel	e-mail	a.ismaeel@utq.edu.iq
Module Leader's Acad. Title	Lecture	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name	Dr. Jamal S. Makki	e-mail	Jamal.sahib@utq.edu.iq
Review Committee Approval	18/06/2023	Version Number	1

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fluid Mechanics	Semester	4
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To obtain a comprehensive understanding of basic of water resources engineering in the context of civil engineering applications.2. This course deals with provide students with analytical and professional abilities to identify, formulate, and solve problems in water resources engineering.3. To develop skills and solving problems by understanding the theories and applying the governing equations4. Develop students' ability to collect and analyze basic measurement data and present the findings in technical reports.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<p><u>On successful completion of this module the learner will be able to:</u></p> <ol style="list-style-type: none">1. Understanding the basic principles of water resources engineering, and using the principles of water resources engineering to solve engineering problems, in addition to knowing the planning and naming of irrigation and drainage networks, as well as understanding the mechanism of water movement within the soil.2. Demonstrate a comprehensive understanding of flow in open channels, and the types of open channels, in addition to the types of flow in open channels.3. Understand and apply the concepts of uniform flow in open channels and its equations, and methods for selecting the optimal economic section in open channels.4. Understand the basic principles of Non-uniform flow in open channels in addition to understand the basic principles of specific energy and specific energy diagram.5. Understanding and applying the concepts of irrigation methods, including (surface irrigation, sprinkler irrigation, and drip irrigation) and identifying the advantages and disadvantages of each type, in addition to the method of designing each type.6. Understanding and applying the concepts of drainage engineering, the mechanism of soil water, applying Darcy's law, in addition to knowing methods for determining permeability in the field.7. Understanding and applying the methods of designing drainage sections, in addition to the mechanism and methods of determining the distances between the drainages.8. Demonstrate a comprehensive understanding of concepts of engineering hydrology, hydrological cycle, in addition to water balance equation.9. Understanding the principles of precipitation, its types and methods of measurement, identifying and applying methods for estimating missing data for precipitation, as well as methods for analyzing precipitation data and methods to determine average precipitation for an area.10. Understanding the principles of hydrograph, its components, identifying and applying methods for hydrograph separation, as well as understanding

	<p>the principles of unit hydrograph.</p> <p>11. Ability to derivation of unit hydrograph from observed flood hydrograph and from complex storms, and conversion of unit hydrograph by super position method and S-curve method.</p> <p>12. Understanding the basic of water losses, infiltration losses, infiltration indices, and applying the rational method for peak discharge estimation.</p> <p>13. Understand the basic principles and mechanism of sediment transport in open channel.</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<p><u>Indicative content includes the following:</u></p> <p><u>Part I - Irrigation and drainage and open channel flow</u></p> <p>Introduction - Irrigation and drainage networks - Movement of water in the soil [6 hrs]</p> <p>Flow in open channel - Types of open channels - Types of flow in open channel [3 hrs]</p> <p>Uniform flow in open channel - Channels of most economical cross section [9 hrs]</p> <p>Non-uniform flow in open channel - The specific energy and specific energy diagram [12 hrs]</p> <p>Methods of irrigation - Surface irrigation - Sprinkler irrigation - Drip irrigation [12 hrs]</p> <p>Drainage engineering - Soil water mechanics - Law of conservation of energy - Potential of ground water - Darcy's law - Measurement of permeability in the field [6 hrs]</p> <p>Design of drainage sections - Spacing of drains [9 hrs]</p> <p>Midterm exam - [2 hr]</p> <p><u>Part II - Engineering hydrology</u></p> <p>Introduction to engineering hydrology - Hydrological cycle - Water balance equation [6 hrs]</p> <p>Precipitation - Methods of estimation of missing precipitation data - Precipitation analysis [6 hrs]</p> <p>Hydrograph - Concept - Its components - Hydrograph separation - Unit hydrograph [6 hrs]</p> <p>Derivation of unit hydrograph from observed flood hydrograph and from complex storms - Conversion of unit hydrograph by super position method and S-curve method [9 hrs]</p> <p>Water losses - Infiltration losses - Infiltration indices - Peak discharge estimation (Rational method) [4 hrs]</p> <p>Introduction to sediment transport in open channel flows [3 hrs]</p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>The assessment strategy is designed to provide students with the opportunity to demonstrate an understanding of the principles, methodologies, and methods of applying various design methods as well as the ability to describe specific systems and processes on a final exam.</p>

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 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)	5, 10	LO #1, 2, 3, 5, 9, 10 and 11
	Assignments	2	10% (10)	3, 11	LO # 3, 4, 5, 11 and 12
	Projects	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 11, 12 and 13
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to water resources engineering - Irrigation and drainage networks - Movement of water in the soil
Week 2	Flow in open channel - Types of open channels - Types of flow in open channel
Week 3	Uniform flow in open channel - Channels of most economical cross section
Week 4	Non-uniform flow in open channel - The specific energy and specific energy diagram
Week 5	Methods of irrigation - Surface irrigation - Sprinkler irrigation - Drip irrigation
Week 6	Drainage engineering - Soil water mechanics - Law of conservation of energy - Potential of ground water - Darcy's law - Measurement of permeability in the field
Week 7	Design of drainage sections - Spacing of drains
Week 8	Mid-term Exam
Week 9	Introduction to engineering hydrology - Hydrological cycle - Water balance equation
Week 10	Precipitation - Methods of estimation of missing precipitation data - Precipitation analysis
Week 11	Hydrograph - Concept - Its components - Hydrograph separation - Unit hydrograph

Week 12	Derivation of unit hydrograph from observed flood hydrograph and from complex storms - Conversion of unit hydrograph by super position method and S-curve method
Week 13	Water losses - Infiltration losses - Infiltration indices - Peak discharge estimation (Rational method)
Week 14	Introduction to sediment transport in open channel flows
Week 15	Preparatory Week
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	Preparatory Week
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	١. هندسة الري والبيزل (شارل شكري سكللا) / ١٩٨١	Yes
Recommended Texts	1. Irrigation and Water Resources Engineering by G.L. Aaswa, 2008 2. Engineering hydrology by subramanya, Third Edition, 2008	No

Websites	
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APPENDIX:

GRADING SCHEME مخطط الدرجات				
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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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.





Ministry of Higher Education and
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University of Thi-Qar
College of Engineering
Department of civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	STRUCTURAL ANALYSIS		Module Delivery	
Module Type	CORE		Lecture & Tutorial	
Module Code	CE306			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGIII	Semester of Delivery		6
Administering Department	Civil Engineering	College	Collage of Engineering	
Module Leader	Dr. Ali A. Sultan		e-mail	ali-abd@utq.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.	
Module Tutor	None		e-mail	None
Peer Reviewer Name	Dr. Ali k. ALASEDE	e-mail	alazharco.2005@utq.edu.iq	
Review Committee Approval	18/06/2023	Version Number	1.0	

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Theory of Structures	Semester	5
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To understand and analyze the indeterminate structures such as building frames and trusses.2. To understand and recognize the difference between force-analysis methods such as consistent deformations and the displacement-analysis methods such as slope-deflection and moment distribution methods.3. To understand and discuss the difference between static indeterminacy and kinematic indeterminacy of structures.4. To discuss the role of “Side-Sway” in the analysis of frames and its effects on the analysis output.5. To understand and analyze the indeterminate structures such as building frames and trusses by the method of consistent deformations.6. To understand and analyze the indeterminate structures such as building frames and beams by the method of slope-deflection.7. To understand and analyze the indeterminate structures such as building frames and beams by the method of moment distributions.8. To introduce and identify the possibility of approximate analysis of indeterminate structures to save time and efforts in some structural systems.9. Expanding the knowledge of software analysis developed in CE301 to analyze indeterminate structures.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Identifying the difference between the analysis of indeterminate rigid-members structures such as beams and frames and flexible members structures such as trusses.2. Identifying and recognizing the difference between static indeterminacy and kinematic indeterminacy of structures.3. Students will be able to recognize and determine the effects of “Side-Sway” on the analysis of frames such as multistorey buildings.4. Students will be able to analyze the indeterminate structures such as building frames and trusses by the method of Consistent Deformations.5. Students will be able to analyze the indeterminate structures such

	<p>as building frames and beams by the method of Slope-Deflection.</p> <ol style="list-style-type: none"> 6. Students will be able to analyze the indeterminate structures such as building frames and beams by the method of Moment Distributions. 7. Comparing the analysis output of multiple analysis methods against each other and identifying the level of accuracy of each method. 8. Students will be able to decide between exact analysis methods and approximate methods, where applicable, to save time and efforts in some applications. 9. Students will be able to expand their knowledge in software analysis developed in CE301 to analyze different types of indeterminate structures.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>The indicative contents of the module are as follows:</p> <ul style="list-style-type: none"> • introduction to the structures static and kinematic indeterminacy. • analysis of indeterminate structures such as rigid and flexible structures by force methods such as consistent deformation method, which depends on static indeterminacy. • analysis of indeterminate structures such as beams, frames by the method of slope-deflections, which depends on the kinematic indeterminacy. • analysis of indeterminate structures such as beams, frames by the method of moment distribution, which depends on the kinematic indeterminacy. • introduction to the approximate analysis of indeterminate structures such as multistorey buildings, beams, and trusses under vertical and horizontal loading scenarios. • Simulation and analysis of indeterminate structures using a simple software such as RISA-2D software. <p>The module will be taught using a combination of lectures, and tutorials. The lectures will cover the basic principles of structural analysis of indeterminate structures. The tutorials will provide students with the opportunity to practice the skills they have learned in the lectures.</p> <p>The module will be assessed by a combination of coursework and an exam. The coursework will consist of a series of analysis problems. The exam will cover the material covered in the lectures and tutorials.</p> <p>The module is designed for students who are interested in a career in civil engineering, structural engineering, or architectural engineering. The skills learned in this module will be essential for the analysis of structures.</p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>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</p>

through classes, interactive tutorials and by involving some homework and assignments activities that are interesting to the students.

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	4.5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.5
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	15% (15)	5, 10	LO #1 through #8
	Assignments	2	10% (10)	2, 12	LO #1 through #8
	Projects	1	15% (15)	13	LO #1 through #9
	Report	0	0% (0)		
Summative assessment	Midterm Exam	2 hr	10% (10)	10	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction – Static and kinematic indeterminacy of structures
Week 2	Analysis of statically indeterminate beams and frames by Consistent Deformation method
Week 3	Analysis of statically indeterminate beams and frames by Consistent Deformation method
Week 4	Analysis of statically indeterminate trusses by Consistent Deformation method
Week 5	Analysis of statically indeterminate trusses by Consistent Deformation method
Week 6	Analysis of statically indeterminate beams by Slope-Deflection method

Week 7	Analysis of statically indeterminate braced (non sidesway) frames by Slope-Deflection method
Week 8	Analysis of statically indeterminate non-braced (with sidesway) frames by Slope-Deflection method
Week 9	Analysis of statically indeterminate beams and frames by Moment Distribution method
Week 10	Analysis of statically indeterminate beams and frames by Moment Distribution method + Midterm exam
Week 11	Approximate analysis of indeterminate trusses
Week 12	Approximate analysis of indeterminate frames and beams subjected to vertical loading
Week 13	Approximate analysis of indeterminate frames subjected to horizontal (i.e., wind) loading
Week 14	Simulation and analysis of indeterminate structures by RISA software.
Week 15	Preparatory Week
Week 16	Final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Structural Analysis: 8 th edition or newer version By: R. C. Hibbeler. Copyright Year: 2012 Published by Pearson Prentice Hall, Pearson Education, Inc.	Older version is available

Recommended Texts	Fundamentals of Structural Analysis: 5 th Edition or newer By: Keeneth M. Leet et al. Copyright Year: 2018. Published by: McGraw-Hill Education.	No
Websites	RISA Homepage	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.





Ministry of Higher Education and Scientific Research
University of Thi-Qar
College of Engineering
Civil Engineering Department



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	PROJECTS MANAGEMENT AND ENGINEERING ECONOMY		Module Delivery
Module Type	CORE		Theory Lecture Lab
Module Code	CE309		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGIII	Semester of Delivery	
Administering Department	Civil Eng.	College	Engineering College
Module Leader	Dr. Kasim Alomari	e-mail	Alomari.kasim@utq.edu.iq
Module Leader's Acad. Title	Asst. Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name	Dr. Alaa Mohsin	e-mail	Alaa.m.mahdi@utq.edu.iq
Review Committee Approval	18/6/2023	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	<ol style="list-style-type: none"> 1. This course is designed to provide an in-depth understanding of the concepts and tools used for analyzing, planning, and managing engineering and construction projects. 2. Focus is placed on planning and scheduling the activities, labor, resources, and equipment required for projects to meet cost and schedule goals. 3. A general understanding of the engineering economy concepts related to money-time relationship is stated. 4. The course is intended for those interested in the civil and construction engineering disciplines and may be useful for others who oversee projects in other engineering disciplines 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Understand and utilize basic planning, analysis, and evaluation techniques designed for civil engineering problems and projects. 2. Develop a CPM network schedule for a project and apply it to calculate time quantities associated with a project's activities. 3. Apply project management techniques to plan and manage project resources and cost. 4. Utilize engineering economics concepts to analyze the economic impacts of projects and evaluate prospective alternatives. 5. Use scheduling software to create and manage a schedule for a project. 6. Evaluate proposed engineering planning concepts and tools, assess their value and practicality 		
Indicative Contents المحتويات الإرشادية	<ol style="list-style-type: none"> 1. Introduction to Engineering Planning <ul style="list-style-type: none"> • Importance of engineering planning • Role of engineering planning in project success • Key concepts and processes in engineering planning 2. Project Development Life Cycle <ul style="list-style-type: none"> • Phases of the project development life cycle: pre-feasibility, feasibility, design, construction, operation, and maintenance • Interdependencies between project phases and their significance • Work Breakdown Structure 3. Project Scoping and Requirements <ul style="list-style-type: none"> • Defining project objectives, goals, and constraints • Identifying stakeholder needs and expectations. • Productivity Impacts 4. Project Scheduling and Time Management 		

	<ul style="list-style-type: none"> • Techniques for project scheduling • Activity sequencing and defining dependencies. • Resource allocation and leveling • Direct and indirect costs in civil engineering projects <p>5. Introduction to Engineering Economy</p> <ul style="list-style-type: none"> • Importance of engineering economy in decision-making • Overview of key concepts in engineering economy • Time Value of Money <p>6. Principles of time value of money</p> <ul style="list-style-type: none"> • Future value, present value, and interest rates • Compounding and discounting cash flows • Cash Flow Analysis • Cash flow diagrams and timelines • Cash flow equivalence and comparison of alternatives • Cash flow analysis for different project durations <p>7. Economic Evaluation Technique</p> <ul style="list-style-type: none"> • Net Present Value (NPV) analysis • Benefit-Cost Ratio (BCR) analysis • Internal Rate of Return (IRR) analysis • Selection criteria for evaluating alternatives. <p>8. Depreciation</p> <ul style="list-style-type: none"> • Types of depreciation methods
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>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 and interactive tutorials. Additionally, Group projects, seminars, and software learning are other examples of teaching strategies that this course utilizes. Moreover, linking practical examples to the theory during the class and lab. is helping a lot in opening student's mind to the field practices.</p>
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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	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	3	15% (15)	4,8,12	LO #1, 2, 3, 4
	HomeWorks	5	10% (10)	2,4,6,10,12	LO # 2, 3, 4, 5, 6
	Project - Lab.	1	15% (15)	Continuous	LO #1 - 3
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-3
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Course Introduction: Planning Basics + Types of Schedules; Scheduling Basics
Week 2	Arrow Diagram Networks and Calculations
Week 3	Precedence Diagram Networks and Calculations
Week 4	Activity Durations; P.E.R.T.
Week 5	Productivity Impacts
Week 6	Resource Allocation + Resource Leveling
Week 7	Mid-term Exam + Engineering Economics: Introduction
Week 8	Engineering Economics: Compounding, Inflation, Money-Time Relationships
Week 9	Cash Flow and Money-Time Relationships
Week 10	Cash Flow and Money-Time Relationships
Week 11	Techniques for Comparing Alternatives
Week 12	Benefit-Cost Ratio Methods
Week 13	Benefit-Cost Ratio Methods
Week 14	Depreciation Calculation methods
Week 15	Course wrap-up and review
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Primavera P6
Week 2	Introduction to Primavera P6
Week 3	Introduction to Primavera P6
Week 4	Creating a Work Breakdown Structure (WBS)
Week 5	Creating a Work Breakdown Structure (WBS)
Week 6	Activity Sequencing and Network Diagramming
Week 7	Midterm exam
Week 8	Activity Sequencing and Network Diagramming
Week 9	Activity Sequencing and Network Diagramming
Week 10	Resource Management and Allocation
Week 11	Resource Management and Allocation
Week 12	Resource Management and Allocation
Week 13	Project presentations
Week 14	Project presentations
Week 15	Project presentations

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	None	NA
Recommended Texts	<ul style="list-style-type: none"> • “Construction Planning and Scheduling,” 4th Edition. Hinze, J.W., McGraw-Hill, Inc., New York, NY, 2012. • “Project Management for Construction: Fundamental Concepts for Owners, Engineers, Architects and Builders.” Hendrickson, C., Version 2.2, 2008, http://pmbook.ce.cmu.edu/. • Any Engineering Economics textbook such as: <ul style="list-style-type: none"> o “Engineering Economic Analysis,” 12th Edition. Newman, D.G., Oxford University Press, New York, NY, 2013. 	NA
Websites	Project Management Institute (PMI): PMI offers a wealth of resources on project	

management, including articles, webinars, and case studies. Their website provides valuable insights into project planning, scheduling, and execution. Visit: <https://www.pmi.org/>

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required



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MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Traffic Engineering	Module Delivery	
Module Type	Core	Theory Lecture Tutorial Practical Seminar	
Module Code	CE308		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3		
Administering Department	Civil	College	Engineering
Module Leader	Ameer Hadi M. Ali	e-mail	ameer-hadi@utq.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	MSc.
Module Tutor	None	e-mail	None
Peer Reviewer Name	Dr.Haider H. Aodah	e-mail	haider-h@utq.edu.iq
Review Committee Approval	18/6/2023	Version Number	1.0

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Surveying	Semester	3
Co-requisites module	None	Semester	===
Module Aims, Learning Outcomes and Indicative Contents			
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. Understanding and deals with the basic concepts of traffic engineering. 2. To develop problem solving skills and understanding of traffic engineering theory through the application of techniques. 3. To understand traffic flow and movement operating, planning and design. 4. To realize Level of Service concept and problems. 5. To appreciate intersection ,types , analysis , design and solve the problems 6. Study horizontal and vertical alignments of roads
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Identification Traffic Movement Components and Principles 2. Ability to diagnose various problems associated with traffic movements. 3. Analyzing various problems associated with traffic movements. 4. Suggestion suitable remedies for traffic problems 5. Planning and administration future traffic projects 6. Planning and Design Intersections (Signalized & Un-signalized) 7. Evaluation level of service for different types of roads and intersections. 8. Design and analyzing horizontal & vertical curves 9. Be acquainted with safety consideration in roads & highways
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following..</p> <p>Part A – Traffic Engineering : deals with the following items..</p> <ul style="list-style-type: none"> - Principles of traffic: Introduction, Components of Traffic System. - Road Location & Survey, Highway Classification. - Traffic Volume Studies , Traffic demand Traffic Speed Studies - Capacity and level of service Concept - L.O.S. Basic segment , L.O.S. Multilane Highways - Intersections :At-grade intersections, Grade separation , Signalized Intersections , Design and analyses of signalized Intersections <p>Part B – Geometric Design: deals with the following items..</p> <ul style="list-style-type: none"> - Cross- Sectional Elements of the roads - Channelization on the roads - Elements of Design <p>Horizontal Alignment on the Roads , Horizontal Curves Types (Design & analysis), Super-Elevation components , Safety Elements on Horizontal Curves</p> <ul style="list-style-type: none"> - Vertical Alignment on the Roads , Vertical Curves ,Safety Elements on Vertical Curves .

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy adopted in delivering this module is to make student thinking in a accurate practical process to identify and analyze any problem and propose the appropriate remedy...as well as give him the essential information and skills which are able the learner to deal with any circumstances.
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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 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	2	10% (10)	4,14	LO #1,2,3,4,5,12 and 13
	Assignments	2	10% (10)	6, 10	LO #1, 2, 6 and 7,8
	Report	1	10% (10)	11	===
	Seminar	1	10% (10)	15	LO # 7 to 13
Summative assessment	Midterm Exam	2 hr	10% (10)	10	LO # 1-9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction - Highway Planning & Administration

Week 2	Traffic Operations
Week 3	Traffic Engineering Studies: Speed study
Week 4	Volume study + Quiz
Week 5	Fundamental Principles of Traffic Flow: Level of Service
Week 6	Capacity + Assignments
Week 7	Geometric design: Cross section element +
Week 8	Design Of the Alignment: Vertical Alignment
Week 9	Horizontal Alignment
Week 10	Mid-term Exam + Assignments
Week 11	Traffic Calming (safety) + Report
Week 12	Intersection design
Week 13	Intersection design – Parking
Week 14	Parking + Quiz
Week 15	Preparatory Week + Seminar

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	Traffic & Highway engineering, Nicholas J. Garber & Lester A. Hoel, fourth edition,	Yes

	University of Virginia.	
Recommended Texts	Highway Geometric Design Code \Iraqi Building Code (I.B.C 103/8)	No
Websites		

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.





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MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	MODERN CONSTRUCTION MATERIALS	Module Delivery	
Module Type	CORE	Theory Lab Tutorial	
Module Code	CE3010		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3		
Administering Department		College	
Module Leader	Dr. Hayder M. Oleiwi	e-mail	hayder.oleiwi@utq.edu.iq
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name	Dr. Haider H. Aodah	e-mail	haider-h@utq.edu.iq
Review Committee Approval	20/06/2023	Version Number	1.0

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CE203 Concrete Technology	Semester	3

Co-requisites module	None	Semester	
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	<ol style="list-style-type: none"> 1. Provide students with the necessary engineering concepts and experiences about the properties and behavior of modern construction materials, as well as the influencing factors that have a major role in determining the quality of these materials produced in various construction fields. 2. Encourages students to think creatively and promotes an innovative mindset. By exploring different materials. 3. Equips students of civil engineering with the knowledge and skills necessary to leverage technological advancements. 4. Optimize construction practices, and contribute to sustainable and resilient infrastructure development. 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Knowledge of new materials: Students will gain a comprehensive understanding of new and innovative construction materials, including their properties, composition, manufacturing processes, and applications. They will be familiar with a wide range of materials, such as advanced composites, high-performance concrete, sustainable materials, and smart materials. 2. Material selection and optimization: Students will develop the ability to evaluate and select appropriate construction materials based on project requirements, considering factors such as structural performance, durability, sustainability, and cost-effectiveness. They will learn how to optimize material choices to achieve desired project outcomes. 3. Analysis of material properties: Students will acquire the skills to analyze and interpret the properties and behavior of new construction materials. This includes understanding mechanical properties like strength, stiffness, and ductility, as well as thermal properties, chemical resistance, and durability. They will learn how to apply this knowledge in material testing, characterization, and performance assessment. 4. Recognize the environmental impact and sustainability aspects of construction materials. 5. Apply material testing techniques to assess material properties. 		

<p>Indicative Contents المحتويات الإرشادية</p>	<p>Introduction to Modern Construction Materials: Overview of traditional materials and their limitations, Overview of modern construction materials and their significance, Evolution of construction materials in the industry.</p> <p>High-performance concrete: Properties and characteristics of high-performance concrete, Mix design and proportioning considerations, Durability and long-term performance.</p> <p>Lightweight Construction Materials: Aerated concrete and its properties, lightweight aggregates and their uses.</p> <p>Nanotechnology in Construction Materials: Introduction to nanotechnology and its relevance to construction, Nanostructured coatings for enhanced performance, Nanoparticles in concrete and their properties, Nanomaterials for insulation and energy efficiency</p> <p>Sustainable Construction Materials: Green building concepts, Sustainable alternatives to conventional materials, Recycled and reused materials in construction.</p> <p>Geopolymer concrete: Chemistry and composition of geopolymer materials, Production methods and curing techniques, Mechanical properties and durability considerations.</p> <p>Smart materials: Introduction to smart materials and their properties.</p> <p>Admixtures and their role in enhancing concrete performance.</p> <p>Supplementary cementitious materials (fly ash, slag, silica fume) and their effects.</p> <p>Mix design of high performance concrete contains admixtures and pozzolanic materials.</p> <p>Corrosion protection of reinforced constructions.</p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>The educational material is delivered, encourage students to discussion, and laboratory tests learning.</p>

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 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, 11	LO #1-3
	Assignments/ In-class discussions	2	10% (10)	4, 10	LO # 1-3
	Laboratory	1	10% (10)	Continuous	LO # 5
	Report/ homework	1	10% (10)	13	LO # 4
Summative assessment	Midterm Exam	1.5 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	Introduction to Modern Construction Materials
Week 2	Admixtures and their role in enhancing concrete performance
Week 3	Supplementary cementitious materials (fly ash, slag, silica fume) and their effects
Week 4	Advanced Construction Materials (High-performance concrete, Fiber-reinforced concrete)
Week 5	Mix design of high-performance concrete and proportioning considerations
Week 6	Corrosion protection of reinforced constructions
Week 7	Lightweight Construction Materials
Week 8	Mid Term Exam
Week 9	Introduction to smart materials and their properties

Week 10	Geopolymer concrete
Week 11	Nanomaterials and their applications in construction
Week 12	Sustainable construction materials
Week 13	Self-compacted concrete
Week 14	Recycling and reuse of construction waste
Week 15	Polymers and Polymer Composites
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Non-destructive testing methods
Week 2	Mechanical and durability testing
Week 3	Mix design of high performance concrete contains admixtures and pozzolanic materials
Week 4	Corrosion measurement and evaluation
Week 5	Standard tests for evaluating material characteristics
Week 6	Mix design of self-compacted concrete
Week 7	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Properties of concrete, A. M. Neville, fifth edition, 2011	Yes
Recommended Texts	Design and Control of Concrete Mixtures, 15 th EDITION, by Steven H. Kosmatka and Michelle L. Wilson	Available online
Websites	www. concrete.org	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.





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MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	REINFORCED CONCRETE DESIGN		Module Delivery	
Module Type	CORE		Lecture & Tutorial	
Module Code	CE307			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGIII	Semester of Delivery		5
Administering Department	Civil Engineering	College	Collage of Engineering	
Module Leader	Dr. Ali k. ALASEDE		e-mail	alazharco.2005@utq.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.	
Module Tutor	None		e-mail	None
Peer Reviewer Name	Dr. Ali A. SULTAN	e-mail	ali-abd@utq.edu.iq	
Review Committee Approval		Version Number	1.0	

Relation With Other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	Mechanics of Materials and concrete technology		Semester	6
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. An introduction to one-way slabs and a study of the analysis and design of this type of slabs2. An introduction to two-way slabs and a study of the analysis and design of this type of slabs3. Studying the types of columns and studying the design and analysis of short columns as well as slender columns4. Continuous beams study analysis and design5. Study a topic Bond development6. Study a Deflection in beams and one-way slabs
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. A complete view of the analysis and design processes for slabs of all kinds in one -way slabs and two- way slabs2. A complete view of the analysis and design processes for all kinds of columns, whether short or thin3. Full view of analysis and design processes for continuous beams and4. Full view of Bond development5. Study a Deflection in beams and one-way slabs
<p>Indicative Contents المحتويات الإرشادية</p>	<p>The indicative contents of the module are as follows:</p> <ul style="list-style-type: none">• 1. INTRODUCTION of one-way slab•• Analysis and design of one-way slab•• Deflection in beams and one-way slabs• INTRODUCTION of two-way slab• Analysis and design of two-way slab•• Analysis and design of continuous beam• INTRODUCTION of short columns• Analysis and design of short columns• Reciprocal Load Method of short columns• INTRODUCTION of Slender columns• Analysis and design of Slender columns

	<ul style="list-style-type: none"> • INTRODUCTION Bond development and cut off of reinforcing bars • Bond development and cut off of reinforcing bars and analysis • Preparatory Week • Final Exam <p>The module will be assessed by a combination of coursework and an exam. The coursework will consist of a series of analysis problems. The exam will cover the material covered in the lectures and tutorials.</p> <p>The module is designed for students who are interested in a career in civil engineering, structural engineering, or architectural engineering. The skills learned in this module will be essential for the analysis of structures.</p>
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>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 involving some homework and assignments activities that are interesting to the students.</p>
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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	5.5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.3
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	2	15% (15)	5, 10	LO #1 through #6
	Assignments	2	10% (10)	2, 12	LO #1 through #6
	Projects / Lab.	0	0% (0)		
	Report	0	0% (0)		
Summative	Midterm Exam	2 hr	25% (25)	10	LO # 1-4

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 of one-way slab
Week 2	Analysis and design of one-way slab
Week 3	Deflection in beams and one-way slabs
Week 4	INTRODUCTION of two-way slab
Week 5	Analysis and design of two-way slab
Week 6	Analysis and design of continuous beam
Week 7	INTRODUCTION of short columns
Week 8	Analysis and design of short columns
Week 9	Reciprocal Load Method of short columns
Week 10	INTRODUCTION of Slender columns
Week 11	Analysis and design of Slender columns
Week 12	INTRODUCTION Bond development and cut off of reinforcing bars
Week 13	Bond development and cut off of reinforcing bars and analysis
Week 14	Preparatory Week
Week 15	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	1. Design of concrete structures Edition 14 , by Arthur H. Nilson, George Winter by McGraw-Hill Book Company. 2. Design of Reinforced Concrete Jack C. McCormac and Russell H. Brown Edition 9. Wiley . 3. ACI Code 318-14.	Older version is available
Recommended Texts	1.Reinforced Concrete Design, 7th Edition, by Chu-Kia Wang and others, 2007, John Wiley & Sons, INC	No
Websites	RISA Homepage	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:	
<p>NB 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.</p>	



MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Sanitary and Environmental Engineering		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory
Module Code	CE406		<input checked="" type="checkbox"/> Lecture
ECTS Credits	8		<input checked="" type="checkbox"/> Lab
SWL (hr/sem)	200		<input checked="" type="checkbox"/> Tutorial
			<input checked="" type="checkbox"/> Practical
			<input checked="" type="checkbox"/> Seminar
Module Level	4	Semester of Delivery	8
Administering Department	Civil	College	Engineering
Module Leader	Ryadh Abood Yasir	e-mail	ryidhabood@utq.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Ryadh Abood Yasir	e-mail	ryidhabood@utq.edu.iq
Peer Reviewer Name	Saleem Ethaib Mohammad	e-mail	dr.saleem@utq.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 Objectives أهداف المادة الدراسية	<p>To understand the basic concept and scopes of Environmental Engineering.</p> <p>To understand the basic concept of Water Pollution and its Control.</p> <p>To study water demand, factors effected on it, population forecasting and fire demand</p> <p>To study the design principle of the process of water treatment plant and network distribution.</p> <p>To study and design the low and high lift pumps and water storage.</p> <p>To study the design of sewerage system (collection, wastewater treatment plant, and disposal).</p> <p>To study the basic concept of Solid and hazardous waste management.</p> <p>To study the basic concept of Air Pollution Management and Control.</p>
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks.</p> <ol style="list-style-type: none"> 1. Taking the knowledge about the methods of analysis and testing. 2. Knows the steps of raw water treatment plants. 3. knowledge to start designing treatment plants style 4. the ability to use laboratory services 5. the ability to understand and analysis 6. the ability to resolve issues that are different from the traditional issues
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following:</p> <p><u>Part A - Basic concept and scopes of Environmental Engineering</u> General introduction, Definition, Scopes of Environmental Engineering, [6 hrs]</p> <p><u>Part B - Water Pollution and its Control</u> Sources of Water Pollution, Types of water pollution, Effects of Water Pollution, Control of water pollution, Self-Purification Of Natural Streams. [14 hrs]</p> <p><u>Part C – Water supply and treatment</u> Water consumption, population, for casting, Fire demand, Water Network analysis, Water Quality and source, water treatment plant (Intake, Coagulation and flocculation, Sedimentation, Filtration and densification, Storage Work, and distribution network. [40 hrs]</p> <p><u>Part D – Wastewater collection and treatment</u> Wastewater/General definitions, Basic concept of wastewater and sewer network, Design of sanitary sewer system, Design of storm sewer system, Primary treatment processes, Design of Grit removal chamber, Primary Sedimentation tank design, Aerobic treatment process, Design of Activated sludge processes, Design of Tricking</p>

	<p>filters [40 hrs]</p> <p><u>Part E – Solid and hazardous waste management</u> Definitions of solid and hazardous, source and types of solid waste, Type of collection systems, landfilling and disposing method. [12 hrs]</p> <p><u>Part F – Air Pollution Management and Control</u> Introduction and Impacts of air pollution, Sources, classification and formation/transformation of air pollutants, Air pollution control devices, equipment and their design. [11 hrs]</p>

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 types 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	123	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	77	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	200		

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

Total assessment	100% (100 Marks)		
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Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basic concept of Environment and sanitary Engineering
Week 2	Properties and contaminants of water
Week 3	Water demand, population forecasting and water consumption rate
Week 4	Pumps and pumping stations, raw water intake and screening
Week 5	Coagulation& flocculation process, applications of sedimentation in water treatment
Week 6	Filtration method, design of rapid sand filter, disinfection process- chlorination break point
Week 7	Midterm
Week 8	Wastewater/general definitions, basic concept of wastewater and sewer network
Week 9	Estimating wastewater quantities, design of sewer system
Week 10	Primary treatment processes, design of grit removal chamber, primary sedimentation tank design
Week 11	Aerobic treatment process, activated sludge processes, trickling filters,
Week 12	Solid waste management (source, collection, transport and disposing)
Week 13	Solid waste management (source, collection, transport and disposing)
Week 14	Air pollution management and control
Week 15	Air pollution management and control
Week 16	final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to the environmental chemistry lab
Week 2	Lab 2: Determination of pH and Turbidity of water
Week 3	Lab 3: Determination of Turbidity of water
Week 4	Lab 4: Determination of Conductivity and Total dissolved solids of water
Week 5	Lab 5: Determination of Alkalinity/Acidity of water
Week 6	Lab 6: Determination and Estimation of total solids, organic solids and inorganic solids of water
Week 7	Lab 7: Jar test Experiment

Week 8	Lab 8: Determination of sulfate of water
Week 9	Lab 9: Determination of Chlorides of water
Week 10	Lab 10: Determination of Dissolved oxygen
Week 11	Lab 11: Determination of BOD5
Week 12	Lab 12: Determination of COD
Week 13	Lab 13: Determination Sludge Volume Index
Week 14	Practical Exam
Week 15	Written exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Water supply and sewerage, fifth edition, E.W. Steel	Yes
Recommended Texts	-Wastewater Engineering Treatment and Reuse, Metcalf & Eddy, McGraw-Hill, 4th edition, 2003. -George, T.M Hilary, T., and Rolf, E., "Solid waste engineering principles and management issues". Dinmark & Michaels, Inc., 2001 - Frank R. Spellman, "Handbook of Environmental Engineering	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.



Ministry of Higher Education and
Scientific Research - Iraq
University of Thi-Qar
College of Engineering
Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	FOUNDATION ENGINEERING		Module Delivery	
Module Type	CORE		√Theory Lecture Lab √Tutorial Practical √Seminar	
Module Code	CE401			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	1	Semester of Delivery		1
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Dr. Ressel R. Shakir		e-mail	rrshakir@utq.edu.iq
Module Leader's Acad. Title	Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Ressel R. Shakir		e-mail	None
Peer Reviewer Name	Dr. Jawad K. Thajeel		e-mail	Jawad.thajeel@utq.edu.iq
Review Committee Approval	01/06/2023		Version Number	1.0

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Soil Mechanics, Applied Soil Mechanics	Semester	1,2
Co-requisites module	None	Semester	
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	<ol style="list-style-type: none"> 1. To make the student knowledgeable about the use of soil mechanics principles in the analysis and design of foundation engineering 2. To develop the ability of student in problem solving skills through the application of foundation engineering. 3. To provide the civil engineer with the theme based understanding of the subsurface exploration. 4. To develop the capability of student to analyze and design shallow foundations 5. To develop the capability of student to design pile foundations 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>The student will be able to:</p> <ol style="list-style-type: none"> 1. Comprehend the principle of subsurface exploration 2. Estimate the number and depth of boreholes for site investigation and the suitable laboratory and field test 3. Understand the theory of bearing capacity of foundation 4. Analyze and design shallow foundation 5. Calculate the elastic settlement of shallow foundation 6. Estimate the consolidation settlement of shallow foundation 7. Analyze and design the pile foundation 8. Estimate the elastic of group piles 9. Estimate the consolidation settlement of group piles 10. Evaluate the adequacy of the pile foundation 		
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p>Chapter 1: Subsurface exploration, definition, purpose of subsurface exploration, subsurface exploration program, site investigation, writing report, determination of depth of boring, other criteria for required depth of borings, number of boring, problems on determining the depth of boring. Methods of sampling, design features affecting the sampling, soil field test, standard penetration test, correlation, cone penetration test, CPT, Plate load test, PLT, Vane shear test VST, problems on the computing of soil parameters from the field test. [6 hrs]</p> <p>Chapter 2: Shallow foundation, definition, Types of foundation, Punching Shear Failure, Local shear failure, General shear failure, Methods of bearing capacity determination, General guidelines for design, Terzaghi's Bearing Capacity Theory, examples. The General Bearing Capacity Equation, Other Solutions for Bearing Capacity, Shape, and Depth Factors, Eccentrically Loaded Foundations, Ultimate Bearing Capacity Under Eccentric Loading—One-Way Eccentricity, Bearing Capacity—Two-Way Eccentricity, Reduction Factor Method (For Granular Soil),</p>		

	<p>Prakash and Saran Theory, Effective Area Method (Meyerhoff, 1953), Combined footing and mat foundation, A Simple Approach for Bearing Capacity with Two-Way Eccentricity, Bearing Capacity of a Continuous Foundation Subjected to Eccentrically Inclined Loading. [15 hrs]</p> <p>Chapter 3: Total Settlement, Elastic settlement (Terzaghi 1943, Goodier 1982), Settlement of a soil layer of finite thickness, Elastic settlement of foundations on saturated clay ($\mu_s = 0.5$) [Janbu et al 1956, . [Elastic settlement on soil with variable Elasticity (Mayne and Poulos method 1999, examples. [3 hrs]</p> <p>Chapter 4: Primary Consolidation Settlement Relationships, Three-Dimensional Effect on Primary Consolidation Settlement , Settlement Due to Secondary Consolidation, Field Load Test , Presumptive Bearing Capacity و Tolerable Settlement of Buildings. [3 hrs]</p> <p>Chapter 5: Piles, Definition, Types of Piles and Their Structural Characteristics, Estimating Pile Length, Point Bearing Piles, Friction Piles, Compaction Piles, Installation of piles, Load transfer mechanism, Equations for Estimating Pile Capacity ,Meyerhof's Method for Estimating Q_p , Vesic's Method for Estimating Q_p Coyle and Castello's Method for Estimating Q_p in Sand , Correlations for Calculating Q_p with SPT and CPT Results in Granular Soil Frictional Resistance (Q_s) in Sand , Frictional (Skin) Resistance in Clay Elastic Settlement of Piles ,Group Piles, Piles , Group Efficiency , Ultimate Capacity of Group Piles in Saturated Clay Elastic Settlement of Group , Consolidation Settlement of Group Piles [15 hrs]</p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>The methodology of learning consists of lectures and tutorials in addition to problem based learning.</p> <p>Lectures will enable students to:</p> <ol style="list-style-type: none"> 1. Appreciate basic concepts and fundamental knowledge of foundation engineering. 2. Relate geotechnical considerations regarding construction works. 3. Apply the soil mechanics concept to analyze and design of foundations such as shallow foundation, pile foundations. <p>Tutorial will enable students to:</p> <ol style="list-style-type: none"> 1. Provide opportunities for consolidating the geotechnical and foundation engineering concepts through problem-solving assignments and discussions 2. Provide an additional opportunity for instructor to deal with any of the student's questions arising from the lectures. <p>Problem based learning enable student to develop their abilities in problem solving, design and analysis through assessing with rubric</p>

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	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	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	2	10% (10)	5, 10	LO #1, 2, 3 and 4
	Assignments	3	10% (10)	2, 12	LO # 5, 6, 8 and 9
	Projects	1	10% (10)	Continuous	
	Seminar	1	10% (10)	13	LO # , 7 and 8
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Subsurface exploration , definition, purpose of subsurface exploration, subsurface exploration program, site investigation, writing report, determination of depth of boring, other criteria for required depth of borings, number of boring, problems on determining the depth of boring.
Week 2	Methods of sampling, design features affecting the sampling, soil field test, standard penetration test, correlation, cone penetration test, CPT, Plate load test, PLT, Vane shear test VST, problems on the computing of soil parameters from the field test.
Week 3	Shallow foundation , definition, Types of foundation, Punching Shear Failure, Local shear failure, General shear failure, Methods of bearing capacity determination, General guidelines for design, Terzaghi's Bearing Capacity Theory, examples.
Week 4	The General Bearing Capacity Equation, Other Solutions for Bearing Capacity, Shape, and Depth Factors
Week 5	Eccentrically Loaded Foundations, Ultimate Bearing Capacity Under Eccentric Loading—One-Way Eccentricity, Bearing Capacity—Two-Way Eccentricity, Reduction Factor Method (For Granular Soil), Prakash and Saran Theory, Effective Area Method (Meyerhoff, 1953)
Week 6	Combined footing and mat foundation

Week 7	A Simple Approach for Bearing Capacity with Two-Way Eccentricity, Bearing Capacity of a Continuous Foundation Subjected to Eccentrically Inclined Loading
Week 8	Total Settlement , Elastic settlement (Terzaghi 1943, Goodier 1982), Settlement of a soil layer of finite thickness, Elastic settlement of foundations on saturated clay ($\mu_s = 0.5$) [Janbu et al 1956, . [Elastic settlement on soil with variable Elasticity (Mayne and Poulos method 1999, examples
Week 9	Primary Consolidation Settlement Relationships, Three-Dimensional Effect on Primary Consolidation Settlement , Settlement Due to Secondary Consolidation, Field Load Test , Presumptive Bearing Capacity وTolerable Settlement of Buildings
Week 10	Piles , Definition, Types of Piles and Their Structural Characteristics, Estimating Pile Length, Point Bearing Piles, Friction Piles, Compaction Piles, Installation of piles, Load transfer mechanism
Week 11	Equations for Estimating Pile Capacity ,Meyerhof's Method for Estimating Q_p , Vesic's Method for Estimating Q_p Coyle and Castello's Method for Estimating Q_p in Sand
Week 12	Correlations for Calculating Q_p with SPT and CPT Results in Granular Soil Frictional Resistance (Q_s) in Sand , Frictional (Skin) Resistance in Clay
Week 13	Elastic Settlement of Piles ,Group Piles, Piles , Group Efficiency ,
Week 14	Ultimate Capacity of Group Piles in Saturated Clay Elastic Settlement of Group ,
Week 15	Consolidation Settlement of Group Piles
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Principle of Foundation Engineering 9th edition, 2019 by	No

	Braja M. Das	
Recommended Texts	Joseph E. Bowles (1997) "Foundation Analysis and Design" Fifth edition McGraw-Hill 2. Donald P. Coduto (2006) "Geotechnical Engineering Principles and Practices" Prentice Hall of India New Delhi-110. 3. Kameswara Rao (2015) "Foundation Design: Theory and Practice" John Wiley & Sons ISBN: 978-0-470-82534-1. ON RESERVE	No
Websites		

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
NB 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.				





Ministry of Higher Education and
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University of Thi-Qar
College of Engineering
Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Hydraulic Structures	Module Delivery	
Module Type	Core	Theory Lecture Tutorial Seminar	
Module Code	CE404		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	UGIV		
Administering Department	Civil Engineering Dep.	College	Engineering college
Module Leader	Dr. Jamal S. Makki	e-mail	Jamal.sahib@utq.edu.iq
Module Leader's Acad. Title	Assist. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name	Abaas J. Ismaeel	e-mail	a.ismaeel@utq.edu.iq
Review Committee Approval	01/06/2023	Version Number	1.0

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fluid Mechanics, Water Resources Engineering,	Semester	4,5
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To provide students with an introduction to the principles and concepts of hydraulic structures. It covers the basic terminology, fundamental equations, and governing principles of water flow and its behavior in hydraulic structures.2. To develop students' skills in designing hydraulic structures. It focuses on the design criteria, methodologies, and considerations for various types of hydraulic structures, such as regulators, weirs, spillways, channels, culverts, and small dams. Students learn about hydraulic design parameters, safety factors, and the use of relevant design codes and guidelines.3. To enhance students' understanding of the structural analysis and stability of hydraulic structures. It covers topics such as structural mechanics, load calculations, stability analysis methods, and foundation design principles. Students gain knowledge and skills in assessing the structural integrity and stability of hydraulic structures.4. To provide students with practical exposure to real-world hydraulic structure projects. It may include case studies of existing structures, their design challenges, and lessons learned from their construction and operation. Students may also engage in project work that involves analyzing and designing hydraulic structures, applying the knowledge gained throughout the semester.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Understanding of Hydraulic Principles: Students will demonstrate a solid understanding of fundamental hydraulic principles, including fluid mechanics, open channel flow, pipe flow, and hydraulic modeling. They will be able to apply these principles to analyze and predict water flow behavior in different hydraulic structures.2. Design Skills: Students will develop the ability to design hydraulic structures effectively. They will be able to apply design criteria, methodologies, and relevant codes and guidelines to design structures such as weirs, spillways, channels, culverts, and small dams. They will demonstrate proficiency in selecting appropriate hydraulic design parameters and safety factors.3. Structural Analysis and Stability: Students will be able to analyze the structural integrity and stability of hydraulic structures. They will understand structural mechanics, load calculations, stability analysis methods, and foundation design principles. They will apply these concepts to assess the stability of hydraulic structures under various loading conditions.

	<p>4. Problem-solving and Project Work: Students will develop problem-solving skills through analyzing and designing hydraulic structures. They will be able to apply their knowledge and skills to real-world case studies and project work. They will demonstrate the ability to work effectively in teams, communicate findings and recommendations, and present their work professionally.</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <ol style="list-style-type: none"> 1. Introduction to Hydraulic Principles: <ul style="list-style-type: none"> - Basic concepts and terminology in hydraulic engineering - Conservation laws: continuity equation, momentum equation, energy equation - Hydraulic gradients and flow profiles 2. Design of Hydraulic Structures: <ul style="list-style-type: none"> - Design criteria and considerations for various hydraulic structures (weirs, spillways, channels, culverts, small dams) - Hydraulic design parameters: flow rates, velocities, water levels - Safety factors and design codes/guidelines - Selection of appropriate hydraulic structures for specific applications - Construction materials and techniques for hydraulic structures 3. Structural Analysis and Stability: <ul style="list-style-type: none"> - Structural mechanics and analysis principles - Load calculations: dead loads, live loads, hydrostatic loads - Stability analysis methods for hydraulic structures - Foundation design and considerations - Seismic considerations in hydraulic structure design 4. Case Studies and Project Work: <ul style="list-style-type: none"> - Analysis of existing hydraulic structures: performance evaluation, design challenges, lessons learned - Case studies of specific hydraulic structure projects - Project work involving the analysis and design of hydraulic structures - Field visits to hydraulic structures or laboratory experiments related to hydraulic modeling and testing - Presentations and discussions on case studies and project findings

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

1. **Lectures and Presentations:** Traditional lectures can be used to introduce and explain key concepts, theories, and principles related to hydraulic structures. Instructors can use multimedia presentations, visual aids, and real-world examples to engage students and facilitate understanding.
2. **Practical Demonstrations:** Hands-on practical demonstrations can provide students with a better understanding of hydraulic phenomena. For example, laboratory experiments can be conducted to demonstrate flow behavior, sediment transport, or the performance of hydraulic models. These practical sessions allow students to observe and interact with hydraulic structures firsthand.
3. **Case Studies and Problem Solving:** Case studies of existing hydraulic structures, such as dams, canals, or flood protection systems, can be analyzed to understand design challenges, operational issues, and lessons learned. Students can be assigned problem-solving tasks related to these case studies, encouraging critical thinking and application of theoretical knowledge to real-world scenarios.
4. **Group Projects and Presentations:** Assigning group projects related to hydraulic structures allows students to collaborate, research, and present their findings. These projects can involve designing a hydraulic structure, conducting a feasibility study, or proposing solutions for specific hydraulic engineering challenges. Group presentations provide opportunities for students to improve their communication and teamwork skills.
5. **Field Visits and Guest Lectures:** Organizing field visits to hydraulic structures or inviting guest lecturers from industry or academia can provide students with practical insights and real-world perspectives. Field visits allow students to observe the functioning, construction, and maintenance of hydraulic structures in person, while guest lectures bring in-depth expertise and practical experiences to the classroom.
6. **Assessments and Feedback:** Regular assessments, such as quizzes, assignments, and exams, help evaluate students' understanding and progress throughout the semester. Providing timely feedback on these assessments enables students to identify areas for improvement and reinforces their learning. Constructive feedback can also be given on project work, encouraging students to refine their ideas and skills.

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	6.65
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.85
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, 8	LO #1, and 3
	Assignments	2	10% (10)	2, 12	LO # 2 and 4
	Projects /	1	10% (10)	Continuous	
	Report	1	10% (10)	14	LO # 1,2,3and 4
Summative assessment	Midterm Exam	2 hr	10% (10)	9	LO # 1-4
	Final Exam	3hr	50% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction, Types of hydraulic structures
Week 2	Regulators, Hydraulics of regulators
Week 3	Floors, Blys theory, Leans theory
Week 4	Specific energy, Hydraulic jump, transitions
Week 5	Stilling basin, Gates, weirs
Week 6	Culverts, Hydraulic design of culverts
Week 7	Structural design of box culverts, Syphon
Week 8	Dams, Classification of dams
Week 9	Types of dams, Earth dams, Midterm Exam

Week 10	Preliminary section of earth dam
Week 11	Type of failure in earth dam
Week 12	Gravity dam
Week 13	Forces acting on gravity dam
Week 14	Elementary profile of gravity dam
Week 15	Preparatory Week
Week 16	Final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Open channel hydraulics V.T Chow	Yes
Recommended Texts	Design of hydraulic structure P. Novak, A.I.B. Moffat, C. Nalluri, R. Narayana	No
Websites		

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				

NB 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.





Ministry of Higher Education and
Scientific Research - Iraq
University of Thi-Qar
College of Engineering
Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	EARTH STRUCTURE		Module Delivery
Module Type	CORE		√Theory Lecture Lab √Tutorial Practical √Seminar
Module Code	CE405		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	4	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Ressel R. Shakir	e-mail	rrshakir@utq.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Ressel R. shakir	e-mail	rrshakir@utq.edu.iq
Peer Reviewer Name	Dr. Jawad K. Thajeel	e-mail	Jawad.thajeel@utq.edu.iq
Review Committee Approval	01/06/2023	Version Number	1.0

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Soil Mechanics	Semester	1,2

Co-requisites module	None	Semester	
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	<ol style="list-style-type: none"> 1. To make the student knowledgeable about the use of soil mechanics principles in the analysis and design of earth structures 2. To develop the ability of student in problem solving skills through the application of lateral earth pressure theories. 3. To develop the capability of student to design retaining walls 4. To develop the capability of student to design sheet piles, anchored sheet piles and anchors 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>The student will be able to:</p> <ol style="list-style-type: none"> 1. understand the concept of lateral earth pressure theory and identify the theories of lateral earth pressure such as Rankine and Coulomb theory of lateral earth 2. Compute the lateral earth pressure using theories of lateral earth pressure in active and passive case 3. analyze, design and evaluate the concrete retaining walls 4. evaluate the stability of geogrid and geotextile reinforced soils used in retaining walls 5. evaluate the stability of sheet piles in clay and sand 6. evaluate the sheet pile and decide the need for anchors 7. analyze and design anchors 8. analyze and design braced cuts 		
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p>Chapter 1: Lateral earth pressure theory, Introduction, Rankine active earth pressure (horizontal surface), Rankine passive earth pressure (horizontal surface) [1857], Rankine active earth pressure (inclined surface), Rankine passive earth pressure (inclined surface), Coulomb theory, active earth pressure, passive earth pressure, problems on lateral earth pressure</p> <p>Chapter 2: Retaining walls, Definition, types of retaining walls, Proportioning of retaining walls, Design methods, stability of retaining walls, sliding, overturning, bearing capacity, Analysis and design of retaining walls, Problems on analysis and design of retaining walls.</p> <p>Chapter 3: Mechanically Stabilized Retaining Walls, Soil Reinforcement, Metal strips, geotextile materials, geogrids, Design consideration, Retaining walls with Metallic strip reinforcement, retaining walls with geotextile reinforcement, retaining walls with geogrid reinforcement, problems on analysis and design of retaining walls with geotextile, geogrid or with metallic strip reinforcement</p> <p>Chapter 4: sheet piles, types of sheet piles, applications, sheet piles driving method, design methods , sheet piles penetrating in sand, problems, sheet piles penetrating in clay, Cantilever sheet piles, supplementary problems on analysis</p>		

	<p>and design of sheet piles</p> <p>Chapter 5: Anchored sheet piles, Definition, Types of design, Anchored sheet piles in clay, anchored sheet piles in design, problems on anchored sheet pile in clay, problems on anchored sheet piles in sand.</p> <p>Chapter 6: Anchors, definition and types of anchors, anchored sheet pile, Semi-empirical method (Ovesen and Stromann, 1972), Stress Characteristic Solution (Stuart and Graham, 1973), Empirical Correlation Based on Model Tests (Ghaly solution,1997). Factor of safety for anchors plates, Spacing of anchors, Ultimate Resistance of Tiebacks, problems on analyzing and designing anchor plates.</p> <p>Chapter 7: Braced cuts, definition, types, methods of construction, applications. pressure envelop for braced-cuts design, design of various components of a braced cuts, struts, sheet piles, problems on design and analysis of braced cuts Pressure envelop for cuts in layered soil problems on cuts in layered soil</p>
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>The methodology of learning consists of lectures and tutorials in addition to problem based learning.</p> <p>Lectures will enable students to:</p> <ol style="list-style-type: none"> 1. Appreciate basic concepts and fundamental knowledge of earth structures. 2. Relate earth structure considerations regarding construction works. 3. Apply the soil mechanics concept to analyze and design of earth structures such as retaining walls and sheet piles <p>Tutorial will enable students to:</p> <ol style="list-style-type: none"> 1. Provide opportunities for consolidating the geotechnical and earth structures concepts through problem-solving assignments and discussions 2. Provide an additional opportunity for instructor to deal with any of the student's questions arising from the lectures. <p>Problem based learning enable student to develop their abilities in problem solving, design and analysis through assessing with rubric</p>
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	102	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	98	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	4, 8	LO #1, 2, 3,4
	Assignments	3	10% (10)	2, 9,12	LO # 1,2, 5,6,7, and 8
	Projects	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
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

	Material Covered
Week 1	Lateral earth pressure theory, Introduction, Rankine active earth pressure (horizontal surface), Rankine passive earth pressure (horizontal surface) [1857], Rankine active earth pressure (inclined surface), Rankine passive earth pressure (inclined surface)
Week 2	Coulomb theory, active earth pressure, passive earth pressure, Problems on lateral earth pressure
Week 3	Retaining walls, Definition, types of retaining walls, Proportioning of retaining walls, Design methods
Week 4	Stability of retaining walls, sliding, overturning, bearing capacity, Analysis and design of retaining walls, Problems on analysis and design of retaining walls.
Week 5	Mechanically Stabilized Retaining Walls, Soil Reinforcement, Metal strips, geotextile materials, geogrids, Design consideration, Retaining walls with Metallic strip reinforcement
Week 6	Retaining walls with geotextile reinforcement, Retaining walls with geogrid reinforcement
Week 7	Problems on analysis and design of retaining walls with geotextile, geogrid or with metallic strip reinforcement
Week 8	Types of sheet piles, applications, sheet piles driving method, design methods , sheet piles penetrating in sand, problems
Week 9	Sheet piles penetrating in clay, Cantilever sheet piles Supplementary problems on analysis and design of sheet piles
Week 10	Anchored sheet piles, Definition, Types of design, Anchored sheet piles in clay, anchored sheet piles in design, problems on anchored sheet pile in clay, problems on anchored sheet piles in sand.
Week 11	Anchors: Definition and types of anchors, anchored sheet pile, Semi-empirical method (Ovesen and Stromann, 1972), stress characteristic solution (Stuart and Graham, 1973), empirical correlation based on model tests (Ghaly solution,1997).
Week 12	Factor of safety for anchors plates, Spacing of anchors, Ultimate Resistance of Tiebacks, problems on analyzing and designing anchor plates.
Week 13	Braced Cuts: definition, types, methods of construction, applications. pressure envelop for braced-cuts design, design of various components of a braced cuts, struts, sheet piles, problems on design and analysis of braced cuts

Week 14	Pressure envelop for cuts in layered soil, problems on cuts in layered soil
Week 15	Preparatory Week
Week 16	Final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Textbook: Required: Braja M. Das, Foundation Engineering, Ninth edition, 2019	No
Recommended Texts	1. Joseph E. Bowles (1997) "Foundation Analysis and Design" Fifth edition McGraw-Hill 2. Donald P. Coduto (2006) "Geotechnical Engineering Principles and Practices" Prentice Hall of India New Delhi-110. 3. Kameswara Rao (2015) "Foundation Design: Theory and Practice" John Wiley & Sons ISBN: 978-0-470-82534-1. ON RESERVE	No
Websites		

APPENDIX:

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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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.





Ministry of Higher Education and Scientific Research
University of Thi-Qar
College of Engineering
Civil Engineering Department



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	اخلاقيات المهنة	Module Delivery	
Module Type	SUPPLEMENT	Theory Lecture	
Module Code	ER401		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGVI	Semester of Delivery	1
Administering Department		College	
Module Leader	Dr. Kasim Alomari	e-mail	Alomari.kasim@utq.edu.iq
Module Leader's Acad. Title	Asst. Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name	Prof. Dr. Ressel R. Shakir	e-mail	rrshakir@utq.edu.iq
Review Committee Approval		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	<ol style="list-style-type: none"> 1. فهم أهمية الأخلاق في مهنة الهندسة المدنية. 2. تحديد التحديات والمعضلات الأخلاقية الخاصة بمشاريع الهندسة المدنية. 3. تطوير المعرفة بقواعد السلوك المهني والمعايير الأخلاقية في العمل 4. تحليل القضايا الأخلاقية المتعلقة بالمسؤولية الاجتماعية والسلامة العامة. 5. تعزيز التفكير الأخلاقي ومهارات اتخاذ القرار في سياقات الهندسة المدنية. 6. تعزيز الشعور بالمسؤولية المهنية. 7. تعزيز السلوك الأخلاقي والنزاهة في ممارسة الهندسة المدنية. 8. تطبيق المبادئ الأخلاقية على دراسات الحالة والسيناريوهات الواقعية. 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. تطوير الفهم لأهمية الأخلاق في مهنة الهندسة المدنية وتأثيرها على المجتمع والسلامة العامة والاستدامة. 2. تعزيز مهارات التفكير الأخلاقي والقدرة على تحديد وتحليل المعضلات الأخلاقية في ممارسة الهندسة المدنية. 3. التعرف على قواعد السلوك المهني والمبادئ التوجيهية الخاصة بمهنة الهندسة المدنية، وفهم الالتزامات والمسؤوليات المنصوص عليها في هذه القواعد. 4. التعرف على الآثار الأخلاقية لمشاريع الهندسة المدنية على الواقع الاجتماعي والبيئي والاقتصادي. ثم تقييم ومعالجة قضايا الوقع اعلاه في التصميم الهندسي والبناء وإدارة المشاريع. 5. تحليل الاعتبارات الأخلاقية المتعلقة بتقييم المخاطر والسلامة والرفاهية العامة في مشاريع الهندسة المدنية. 6. التعرف على دور القيادة الأخلاقية في تعزيز وتعزيز الثقافة التنظيمية الأخلاقية داخل شركات ومشاريع الهندسة المدنية. 7. فهم الجوانب القانونية والمسؤولية المهنية المرتبطة بممارسة الهندسة المدنية والتعرف على العلاقة بين الأخلاق والقانون ، وكذلك العواقب المحتملة للسلوك غير الأخلاقي. 8. تطبيق المبادئ الأخلاقية لتحليل وتقييم دراسات الحالة وسيناريوهات العالم الحقيقي في الهندسة المدنية وتطوير مهارات الاتصال الفعال لمناقشة ومعالجة القضايا الأخلاقية مع أصحاب الشأن. 9. تطوير وعي متزايد بالقضايا والمعضلات الأخلاقية التي قد تنشأ في مختلف السياقات الشخصية والمهنية، وتعلم الأطر لاتخاذ القرارات الأخلاقية. 		
Indicative Contents المحتويات الإرشادية	<ol style="list-style-type: none"> 1. تعريف أخلاقيات مهنة الهندسة: <ul style="list-style-type: none"> • تعريف أخلاقيات مهنة الهندسة وتمييزها عن أخلاقيات المهن الأخرى. • توضيح الأهمية الكبيرة لأخلاقيات مهنة الهندسة في المجتمع. 2. قيم ومبادئ أخلاقية في مهنة الهندسة: <ul style="list-style-type: none"> • استكشاف القيم والمبادئ الأساسية التي تحكم مهنة الهندسة مثل النزاهة، والمسؤولية، والصدق، والاحترام، والاستدامة. • مناقشة تطبيقات هذه القيم والمبادئ في مجالات مختلفة داخل الهندسة مثل البناء والتصميم والاستشارات. 3. تحليل القضايا الأخلاقية في الهندسة: <ul style="list-style-type: none"> • تعريف الطلاب على القضايا الأخلاقية الشائعة في مجال الهندسة مثل التوازن بين المصالح المتعارضة، وتصميم آمن ومستدام، وتأثير التكنولوجيا على المجتمع والبيئة. • تطوير مهارات التحليل الأخلاقي واتخاذ القرارات الأخلاقية في سياق الهندسة. 		

	<p>٤. أخلاقيات العمل المهني:</p> <ul style="list-style-type: none"> • توضيح المعايير الأخلاقية التي يجب على المهندسين اتباعها في العمل المهني. • مناقشة مسائل مثل النزاهة المهنية، والاحترافية، والتواصل الفعال، والتعامل مع تعارض المصالح. <p>٥. القوانين واللوائح المهنية:</p> <ul style="list-style-type: none"> • استعراض القوانين واللوائح التي تنظم مهنة الهندسة وتحدد المسؤوليات الأخلاقية للمهندسين. • تسليط الضوء على المسؤوليات القانونية والأخلاقية المترتبة على ممارسة مهنة الهندسة. <p>٦. دراسة حالات وتحليلها:</p> <ul style="list-style-type: none"> • استخدام حالات دراسية وسيناريوهات واقعية لاستكشاف قضايا أخلاقية يواجهها المهندسون في ممارسة عملهم. • تشجيع الطلاب على مناقشة وتحليل هذه الحالات وتقديم حلول أخلاقية للتحديات المطروحة.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>١. تنظيم مناقشات وحوارات مع الطلاب حول قضايا أخلاقية متعلقة بمهنة الهندسة واستخدام الأمثلة الواقعية والحالات الدراسية لتحفيز النقاش وتبادل وجهات النظر المختلفة.</p> <p>٢. استخدام حالات دراسية وسيناريوهات تطبيقية لإطلاع الطلاب على تحديات وقضايا أخلاقية حقيقية في مجال الهندسة وترك الطلاب يحللون ويناقشون الحالات ويقدمون حلولاً أخلاقية.</p> <p>٣. توفير فرص لتطبيق المبادئ الأخلاقية في سيناريوهات ومشاريع عملية. كما يمكن للطلاب التعاون معاً لحل مشاكل أخلاقية وتقديم توصيات مهنية تستند إلى المبادئ الأخلاقية.</p> <p>٤. تقديم فهم للأطر القانونية واللوائح ذات الصلة بمهنة الهندسة وشرح التأثيرات الأخلاقية لتلك القوانين. ومناقشة الحالات التي تتعارض فيها القوانين مع المسؤولية الأخلاقية واستكشاف الحلول الممكنة.</p>
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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 أسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعياً	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	20% (20)	4, 8, 12	1 – 2
	HWs	4	10% (10)	3,5,9,11	1 – 4
	Seminar	1	10% (10)		
Summative assessment	Midterm Exam	2 hr	10% (10)	7	1 – 5
	Final Exam	2hr	50% (50)	16	1 – 8
Total assessment			100% (100)		

3. Engineering Ethics Resources: موقع يوفر مجموعة من الموارد والروابط المفيدة حول أخلاقيات المهنة في الهندسة. يحتوي على مقالات ودروس وكتب وحالات دراسية وأخبار حديثة في مجال أخلاقيات المهنة. زيارة الموقع: <http://www.engineeringethics.ca/>

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.



Ministry of Higher Education and
Scientific Research - Iraq
University of Thi-Qar
College of Engineering
Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	QUANTITY SURVEYING AND CONSTRUCTION METHOD		Module Delivery
Module Type	CORE		Class Lecture Classroom Lecture (online) Tutorial
Module Code	CE408		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	
Administering Department	Civil Engineering Dep.	College	Engineering college
Module Leader	Alaa Mohsin Mahdi	e-mail	alaa.m.mahdi@utq.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.sc.
Module Tutor	None	e-mail	None
Peer Reviewer Name	Dr. Kasim Alomari	e-mail	alomari.kasim@utq.edu.iq
Review Committee Approval	17/06/2023	Version Number	1

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	<p><u>This course will familiarize the student with :</u></p> <ol style="list-style-type: none"> 1. Concepts, principles & importance of estimation in construction projects and role of estimating engineer during construction project Life Cycle, estimation types. 2. Work breakdown methods of construction project into items. 3. Quantities estimation methods for construction projects and preparing Bill of Quantities (BOQ). 4. Appropriate methods and techniques for cost estimation, unit cost analysis methods and pricing in construction projects. 5. Progress payments rules. 6. Iraqi Standard Bidding Documents (ISBD) and contractual arrangements that may be adopted in the construction industry and in compliance with Iraqi standards 7. Cost planning and appropriate initial cost estimation methods of construction projects. 8. Selection methods of the best tender 9. Engineering rules to select the appropriate construction methods and construction equipment 10. Various types of construction equipment used in the construction industry, including their functions, operating principles and productivity. 11. The procedures of selecting the appropriate equipment for different construction tasks based on factors such as project requirements, site conditions ,owning and operating cost and productivity 12. The methods used to identify the economic life of construction equipment. 13. Principles of safety engineering. 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p><u>This course will provide students with an opportunity to develop the graduate attributes specified below:</u></p> <ol style="list-style-type: none"> 1. Students should gain the ability to learn the fundamental principles and concepts of quantity surveying, including measurement techniques, cost estimating, cost planning, and contract administration. 		

	<ol style="list-style-type: none"> 2. Students should develop skills in accurately measuring and quantifying construction works, taking off quantities, and preparing bills of quantities. 3. Students should also be able to apply appropriate estimating techniques to determine the costs associated with construction projects and pricing of construction project items. 4. Students should gain knowledge of various types of construction contracts and their management. This includes understanding contract documentation, contracting processes, contract negotiation and to familiarize students technical specification. 5. Deep knowledge and intellectual breadth and comprehensive knowledge and understanding of their subject area and the ability to apply their knowledge in practice 6. Students should gain knowledge, creative and the ability to solve the future challenges effectively. 7. Students should be able to apply the fundamentals of initial cost estimation methods for buildings 8. Students should be able to make decision for selecting the best tender. 9. Students should gain the ability to read and interpret technical engineering drawings 10. Students should be able to adopt an appropriate contractual arrangements in the construction industry 11. Students should gain the ability to select the best construction methods as well as construction equipment 12. Students should be able to make decision for selecting and replace construction equipment according to work conditions and economic life.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A - Quantity Surveying and Specifications</u></p> <ul style="list-style-type: none"> • Introduction to estimation and role of estimating engineer during Construction project life cycle, the types of estimating (detailed estimation, approximate estimation), the types of measurements and units of measurement used to measure quantities. [3 hrs] • Construction works (classification and methods of measurement by using a Iraqi standard guide). [3 hrs] • Quantities estimation methods for construction projects and bill of quantities (BOQ). [6 hrs] • Earthworks for civil Construction projects. [6 hrs] • Cost planning and initial cost estimation methods of Construction

	<p>projects [6 hrs]</p> <ul style="list-style-type: none"> • Unit cost analysis methods and Pricing of construction projects items. [6 hrs] • Iraqi Standard Bidding Documents (ISBD) & Technical Specifications for the construction project [6 hrs] • Progress payments rules. [6 hrs] • Selection methods of the best tender. [3 hrs] • Final project. [3 hrs] <p>Part B - Equipment and Construction Method</p> <ul style="list-style-type: none"> • Construction equipment (classification and uses). [3 hrs] • Key factors to Select the construction equipment. [6 hrs] • Economic life of construction equipment. [3 hrs] • Engineering rules to select of construction equipment. [6 hrs] • Soil Stabilization and compaction. [3 hrs] • Tractors and related equipment, Scrapers, excavation equipment. [9 hrs] • Concrete industry & concrete productivity. [3 hrs] • Formwork for concrete structures. [6 hrs] • Piles and Pile-driving equipment, pumping equipment. [3 hrs] • Safety engineering. [3 hrs]
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
Strategies	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 , classroom ,Seminar and homework

<p>Student Workload (SWL) الحمل الدراسي للطالب</p>			
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	32	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	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 #(1,2,3,5,7,11,12)
	Assignments (H.W)	13	10% (10)	(2- 5) and (7, 9) and (10-14)	All
	Projects	1	10% (10)	Continuous ...9	LO #(1-10)
	Seminar	2	10% (10)	(4,13)	LO # (1,2,5,11,12)
Summative assessment	Midterm Exam	2 hr	10% (10)	9	LO#(1,2,5,6,7,11,12)
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	<ul style="list-style-type: none"> Introduction to estimation and role of estimating engineer during Construction project life cycle, the types of estimating (detailed estimation, approximate estimation), the types of measurements and units of measurement used to measure quantities. Construction works (classification and methods of measurement by using a Iraqi standard guide).
Week 2	Quantities estimation methods for construction projects and bill of quantities (BOQ).
Week 3	Earthworks for civil Construction projects.
Week 4	Cost planning and initial cost estimation methods of Construction projects Cost planning and initial cost estimation methods of Construction projects (Floor-Area method , Cubic method , Approximate Quantities method , Unit Functional method
Week 5	Unit cost analysis methods and pricing of construction projects items.
Week 6	Iraqi Standard Bidding Documents (ISBD) & Technical Specifications for the construction project
Week 7	<ul style="list-style-type: none"> Progress payments rules. Selection methods of the best tender..
Week 8	Final project.
Mid Term Exam	
Week 9	<ul style="list-style-type: none"> Construction equipment (classification and uses). Key factors to select the construction equipment.
Week 10	<ul style="list-style-type: none"> Key factors to select the construction equipment.

	<ul style="list-style-type: none"> Economic life of construction equipment.
Week 11	Engineering rules to select of construction equipment.
Week 12	<ul style="list-style-type: none"> Soil stabilization and compaction. Tractors and related equipment, Scrapers, excavation equipment.
Week 13	Tractors and related equipment, Scrapers, excavation equipment.
Week 14	<ul style="list-style-type: none"> Concrete industry & concrete productivity. Formwork for concrete structures.
Week 15	<ul style="list-style-type: none"> Formwork for concrete structures. Piles and Pile-driving equipment , pumping equipment Safety engineering.
Final Exam	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	<ul style="list-style-type: none"> التخمين والمواصفات- الدكتور غانم عبد الرحمن . تخطيط ومعدات وطرق الإنشاء ، الجزء الأول - ترجمة الدكتور محمد ايوب صبري الغزي 	Yes
Recommended Texts	<ul style="list-style-type: none"> التخمين والمواصفات -مدحت فضيل فتح الله . كميات ومواصفات - المؤسسة العامة للتعليم الفني والتدريب المهني ، الإدارة العامة لتصميم وتطوير المناهج المملكة العربية السعودية. Estimating Construction Costs , Fifth Edition – Robert L. Peurifoy , Garold D. Oberlender . Willis's Elements of Quantity Surveying , Sandra Lee and William Trench. Estimating and Costing for the Civil Engineering Industry, Michael A. Pegg 	No
Websites		

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.





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MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	STEEL STRUCTURES DESIGN		Module Delivery
Module Type	CORE		<input checked="" type="checkbox"/> Theory
Module Code	CE407		<input checked="" type="checkbox"/> Lecture
ECTS Credits	7		<input type="checkbox"/> Lab
SWL (hr/sem)	175		<input checked="" type="checkbox"/> Tutorial
			<input type="checkbox"/> Practical
			<input type="checkbox"/> Seminar
Module Level	4	Semester of Delivery	8
Administering Department	Type Dept. Code C	College	Type College Code E
Module Leader	Dr. Wasan Q. Fayyadh	e-mail	wasan.q.fayyadh@utq.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name	Dr. Mohammed A. Mashrei	e-mail	mamashrei@utq.edu.iq
Review Committee Approval		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	<ol style="list-style-type: none"> 1. Understand the basic principles of steel design 2. Be able to select the appropriate steel sections for a given structure 3. Be able to calculate the forces and stresses in steel members 4. Be able to design steel connections 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Understand the basic principles of steel design: This includes understanding the different types of steel structures, the forces and stresses that act on these structures, and the design principles that are used to ensure that these structures are safe and reliable. 2. Be able to select the appropriate steel materials for a given structure: This includes understanding the different properties of steel materials, such as their strength, ductility, and toughness, and how these properties affect the design of a structure. 3. Be able to calculate the forces and stresses in steel structures; that act on a structure due to its own weight, the loads that it is subjected to, and the environmental conditions that it is exposed to. 4. Be able to design steel structures to resist these forces and stresses: This includes using the principles of steel design to determine the dimensions and cross-sections of the members of a structure, as well as the type of connections that are used to join these members together. 5. Be able to use SAP2000 software which is a tool used for creating and analyzing steel structural models. This includes using the software to create two-dimensional and three-dimensional models of steel structures, as well as to generate drawings and reports that can be used to fabricate and construct these structures. 		

<p>Indicative Contents المحتويات الإرشادية</p>	<p>The indicative contents of the module are as follows:</p> <ul style="list-style-type: none"> • Introduction to steel design • Steel materials • Steel sections • Force analysis of steel structures • Stress analysis of steel members • Steel connections <p>The module will be taught using a combination of lectures, and tutorials. The lectures will cover the basic principles of steel design. The tutorials will provide students with the opportunity to practice the skills they have learned in the lectures.</p> <p>The module will be assessed by a combination of coursework and an exam. The coursework will consist of a series of design problems. The exam will cover the material covered in the lectures and tutorials.</p> <p>The module is designed for students who are interested in a career in civil engineering, structural engineering, or architectural engineering. The skills learned in this module will be essential for the design of steel structures.</p> <p>Here are some additional details about the topics that will be covered in the module:</p> <ul style="list-style-type: none"> • Steel materials: The properties of steel, including yield strength, ultimate strength, and modulus of elasticity. • Steel sections: The different types of steel sections available, including beams, columns, and truss members. • Force analysis of steel structures: The calculation of forces in steel members due to dead load, live load, wind load, and earthquake load. • Stress analysis of steel members: The calculation of stresses in steel members due to the forces calculated in the force analysis. • Steel connections: The different types of steel connections, including welded connections, and bolted connections.

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.

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 أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	12% (12)	5, 13	LO #1-4 and 10-12
	Assignments	4	14% (14)	5, 7, 10, 13	LO # 3, 4, 6 and 7
	Project	1	14% (14)	Continuous	
Summative assessment	Midterm Exam	2 hr	10% (10)	10	LO # 1-9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction – Basic concept
Week 2	Method of design

Week 3	Tension member (analysis)
Week 4	Tension member (design)
Week 5	Bolt connections
Week 6	Weld connections
Week 7	Compression members (analysis)
Week 8	Compression members (design)
Week 9	Design of base plate
Week 10	Analysis of beam (virtual method)
Week 11	Design of beams for moment
Week 12	Design of beams for shear and deflection
Week 13	Beam-column analysis
Week 14	Beam-column design
Week 15	Types of steel frames used for buildings
Week 16	Preparatory Week for 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	AISC-LRFD Manual. Handbook and Specifications	Yes

Recommended Texts	Structural Steel Design by Mc Cormac and Csernak, Fifth Edition, 2012.	Yes
Websites		

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
NB 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.				





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Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	DESIGN OF REINFORCED CONCRETE STRUCTURES		Module Delivery
Module Type	CORE	<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	CE402		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	4	Semester of Delivery	7
Administering Department	Type Dept. Code C	College	Type College Code E
Module Leader	Prof. Dr. Mohammed A Mashrei	e-mail	mamashrei@utq.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	None	e-mail	None
Peer Reviewer Name	Dr Ali A. Khamees	e-mail	ali-almalki@utq.edu.iq
Review Committee Approval		Version Number	1.0

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CE302, CE307	Semester	Five and six
Co-requisites module		Semester	
Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية			
Module Aims أهداف المادة الدراسية	Objectives of the Course <ol style="list-style-type: none"> 1) Introduce students to the basic types and behavior of materials. 2) Basic understanding of behavior of prestressed concrete. 3) Analysis and Design of simple and cantilever prestressed concrete beams. 4) Moment curvature relations 5) To analyze and design of two-way R.C slabs 6) To identify and apply the applicable design codes relevant to the design of reinforced concrete prestress and two-way concrete slab 7) Deflection calculations of two-way slab 8) By the end of the course, students should be able to design of prestress beams and R.C two-way slab. 		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of the course students are expected to be able to: <ol style="list-style-type: none"> 1) Understanding of prestressing in concrete. 2) Knowledge on design and construction of prestressed concrete. 3) Understanding flexural response of S.S and cantilever prestressed concrete beams. 4) Ability to employ the code of practice for design of reinforced concrete two-way slab 5) Students will be required to perform the individual assignments. 6) Working familiarity with the ACI code 		
Indicative Contents المحتويات الإرشادية	Structural Theory and Design of two-way slabs, in particular the section on the fundamental behavior of reinforced concrete structural when subjected to flexure and shear, deflection of two-way slabs; Yield line method; Introduction to strut-and-tie modelling which is used in the analysis and design of complex regions in concrete elements where simple flexural behavior is disrupted. Partially prestressed concrete beams: Properties of prestressing steel and types of prestressing systems; Sectional behavior at service load level, equivalent load concept and load balancing; Creep and shrinkage in concrete; Estimation of prestress losses, design and analysis of pre-stressed concrete structures deflection and amount of cracking;		
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.
Generic skills	<ul style="list-style-type: none"> • Ability to apply knowledge of science and engineering fundamentals • Ability to undertake design problem identification, formulation, and solution • Capacity for creativity and innovation • Proficiency in engineering design • Understanding of professional and ethical responsibilities, and commitment to them • Capacity for lifelong learning and professional development.

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	5.47
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)	4, 8, 12	LO #1, 3 and 5
	Assignments	6	10% (15)	3, 5, 7, 9, 11, 13	LO # 3, 2, 5 and 7
	Project	1	10% (10)	Continuous	LO # 3, 2, 5 and
	Discussion in class	---	5% (5)	All	
Summative assessment	Midterm Exam	2 hr	10% (10)	10	LO # 1-9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introductions for Slab systems and types
Week 2	Analysis and design of two-way slabs by direct design method
Week 3	Analysis and design of two-way slabs by direct design method
Week 4	One way and two-way shear actions (Punching shear) requirements
Week 5	Analysis and design of two-way slabs by equivalent frame method
Week 6	Analysis and design of two-way slabs by equivalent frame method
Week 7	Yield line analysis of irregular slabs
Week 8	Introduction to Strut and tie Model
Week 9	Introductions for pre-stressing systems and types of pre-stressing forces
Week 10	Checking the stresses of beams due to loads and pre-stressing forces
Week 11	Estimation of pre-stressing losses
Week 12	Flexural analysis of beams due to loads and pre-stressing forces
Week 13	Flexural design according to ultimate design methods stresses
Week 14	Envelopes for Tendon Placement and kern points
Week 15	Flexural design according to allowable stresses
Week 16	Preparatory Week for Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	ACI 318-19 & PCI design handbook of "Precast and Prestressed Concrete	Yes
Recommended Texts	<ul style="list-style-type: none"> • Nawy, Edward "Prestressed Concrete: A Fundamental Approach. • Naaman, A.E. "Prestressed Concrete Analysis and Design: Fundamentals" (2nd Edition), Techno Press 3000 • Nilson, A.H. "Design of Prestressed Concrete 	Yes
Websites		

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.





Ministry of Higher Education and
Scientific Research - Iraq
University of Thi-Qar
College of Engineering
Department of Civil Engineering



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	HIGHWAY ENGINEERING		Module Delivery	
Module Type	CORE		Theory Lecture Lab Tutorial Practical Seminar	
Module Code	CE 403			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	4	Semester of Delivery		7
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Dr.Haider H. Aodah		e-mail	haider-h@utq.edu.iq
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.
Module Tutor	None		e-mail	None
Peer Reviewer Name	Lect. Ameer Hadi		e-mail	ameer-hadi@utq.edu.iq
Review Committee Approval	15/06/2023		Version Number	1.0

Relation With Other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	CE 308 Traffic Engineering		Semester	6
Co-requisites module	CE 303 Fundamental of soil mechanics		Semester	5

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. Introduce students to the basic types and behavior of highway materials. 2. Expose students to the general aspects of pavement structural design, flexible or rigid. 3. Expose students to the analysis concepts and procedures for stresses, strains, and deflection in pavements. 4. Introduce students to commercially available software in the area of pavement structural design. 5. Expose students to the general aspects of pavement maintenance, flexible or rigid.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<p>The student will be able to:</p> <ol style="list-style-type: none"> 1. Understand subgrade properties ; 2. Classify soil based using standard classification schemes; 3. Study asphalt cement and aggregate properties; 4. Design of asphalt mixture; 5. Study the structural 6. Design of flexible pavement layers; and 7. Design of rigid pavement thickness and joint types
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>Subgrade Soil Characterization: Properties of subgrade layers; different types of soils, Mechanical response of soil; Soil Classification; Index and other basic properties of soil; A critical look at the different laboratory and in-situ procedures for evaluating the mechanical properties of soils viz. CBR, Plate Load test & resilient modulus; Suitability of different types of soil for the construction of highway embankments and pavement layers; Field compaction and control. Dynamic properties of soil: FWD test.</p> <p>Introduction to Soil Stabilization: Physical and Chemical modification: Stabilization with admixtures like cement, lime, calcium chloride, fly ash, and bitumen. Grouting: Categories of grouting, Art of grouting, Grout materials, Grouting techniques and control. Introduction to Ground improvement techniques; Introduction to Geo textiles and synthetics applications.</p> <p>Aggregate Characterization: Origin, Classification, Types of aggregates; Sampling of aggregates; Mechanical and shape properties of aggregates, Aggregate texture and skid resistance, polishing of aggregates; Proportioning</p>

	<p>and Blending of aggregates: Super pave gradation, Fuller and Thompson's Equation, 0.45 power maximum density graph; Use of locally available materials in lieu of aggregates.</p> <p>Bitumen And Bituminous Concrete Mix Characterization: Bitumen sources and manufacturing, Chemistry of bitumen, bitumen structure, Rheology of bitumen, visco-elastic and fatigue properties, creep test, Permanent Deformation Parameters, and other Properties. Modified bitumen: Crumb Rubber Modified bitumen, Natural rubber modified bitumen, polymer modified bitumen; Introduction to emulsified bitumen and its characterization; term-Long and short-term aging and its effect on bitumen performance.</p> <p>Hot Mix Asphalt Design:- Desirable properties of bituminous mixes, Design of bituminous mixes: Modified Marshall's specifications, Introduction to super pave mix design procedure.</p> <p>Flexible and rigid pavement structure design</p>
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>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 types of simple experiments involving some sampling activities that are interesting to the students.</p>
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	110	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	65	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4
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, 9	LO #1, 2, 5 and 9
	Assignments	2	10% (10)	11, 14	LO # 3, 4, 6 and 7
	Laboratory	1	10% (10)	Continuous	
	Report	1	10% (10)	14	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hrs.	10% (10)	7	LO # 1-7
	Final Exam	3hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	<i>Introduction</i>
Week 2	<i>Subgrade soil classification and stabilization</i>
Week 3	<i>Subgrade soil Tests for Highways.</i>
Week 4	<i>Aggregate properties and combination</i>
Week 5	<i>Asphalt cement properties I</i>
Week 6	<i>Asphalt cement properties II</i>
Week 7	<i>Iraqi Specifications Requirements R5, R6, R7 and R9</i>
Week 8	Mid Term Exam
Week 9	<i>Design of Bituminous mixes (Marshall method) I</i>
Week 10	<i>Design of Bituminous mixes (Marshall method) II</i>
Week 11	<i>Flexible pavements design methods, AASHTO method. I</i>
Week 12	<i>Flexible pavements design methods, AASHTO method. II</i>
Week 13	<i>Rigid pavements: Types, Joints</i>
Week 14	<i>Rigid pavements: design methods, AASHTO method</i>
Week 15	<i>Rigid pavements: reinforcements</i>

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	<i>Introduction</i>
Week 2	<i>California Bearing Ratio (CBR) and plate Load tests</i>
Week 3	<i>Specific Gravity and Water Absorption of Aggregate</i>
Week 4	<i>Abrasion Test (Los Angeles Test) and Shape (Flakiness and Elongation) Tests</i>
Week 5	<i>Coarse Aggregate Angularity and Fine Aggregate Angularity Tests</i>
Week 6	<i>Stripping Value and Sand Equivalent Tests</i>
Week 7	<i>Percentage of fractured faces and clay lumps and friable particles tests</i>
Week 8	Mid Term Exam
Week 9	<i>Penetration and Softening Point Tests</i>
Week 10	<i>Ductility and Specific Gravity Tests</i>
Week 11	<i>Flash and Fire Point and Solubility Tests</i>
Week 12	<i>Marshall Mix Design I</i>
Week 13	<i>Marshall Mix Design II</i>
Week 14	<i>Marshall Mix Design III</i>
Week 15	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	
Required Texts	1) Yoder and Witczak, Principles of Pavement Design, John Wiley. 2) Yang. H. Huang, Pavement Analysis and Design, Second Edition.	
Recommended Texts	1) AASHTO, (1993), "Guideline for design of Pavement Structure". 2) Highway Engineering (1987), 7th edition. By C. Oglesby and R. Hicks 3) The Asphalt Institute, (1994), "Thickness Design-Asphalt Pavements for Highway and Streets". 4) Ministry of Housing and Construction, (2003), "Standard Specifications of Roads and Bridge", Republic of Iraq.	
Websites	Pavement interactive website	

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