

الجامعة العراقية
كلية الهندسة
برنامج مسار بولونيا لقسم الهندسة
المدنية
2025-2026



The logo of the University of Al-Qadisiyah is a large, faint watermark in the background. It features a green archway with a blue silhouette of a person standing inside. Below the archway, the university's name is written in Arabic and English. The Arabic text 'الجامعة العراقية' (The Iraqi University) is in a large, stylized font, and the English text 'UNIVERSITY OF AL-QADISIYAH' is in a smaller, sans-serif font.

الملحق (1) دليل المنهاج الدراسي Curriculum

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
UG III	Five	1	UICE500	Structural Analysis I	التحليل الهيكلي ١	English	3				1		2	62	63	125	5.00	C	UICE301
		2	UICE501	Soil Mechanics I	ميكانيك التربة ١	English	2		2		1		2	77	73	150	6.00	C	UICE203
		3	UICE502	Engineering and Numerical Analysis	التحليلات الهندسية والععددية	English	2				1		2	47	53	100	4.00	B	
		4	UICE503	Building Services	خدمات الابنية	English	3						2	47	53	100	4.00	E	UICE304
		5	UICE504	Sanitary Engineering and Plumbing Design I	الهندسة الصحية والتصميم الصحي ١	English	3		1		1		2	77	48	125	5.00	C	
		6	UICE505	Reinforced Concrete Design I	تصميم الخرسانة المسلحة ١	English	2				2		2	62	88	150	6.00	C	
							Total	15	0	3	0	6	0	12	372	378	750	30.00	
UG III	Six	1	UICE600	Sanitary Engineering and Plumbing Design II	الهندسة الصحية والتصميم الصحي ١	English	2		2				3	63	62	125	5.00	C	UICE304
		2	UICE601	Reinforced Concrete Design II	تصميم الخرسانة المسلحة ٢	English	3				1		2	62	88	150	6.00	C	UICE501
		3	UICE602	Soil Mechanics II	ميكانيك التربة ٢	English	2		2		1		3	78	72	150	6.00	C	
		4	UICE603	Traffic Engineering	هندسة المرور	English	3				1		2	62	63	125	5.00	C	UICE501
		5	UICE604	Structural Analysis II	التحليل الهيكلي	English	3				1		2	62	63	125	5.00	C	
		6	UICE605	Computer Applications in Civil Engineering	تطبيقات الحاسوب في الهندسة المدنية	English	1		2				2	47	28	75	3.00	C	
							Total	14	0	6	0	4	0	14	374	376	750	30.00	
Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)							
UG IV	Seven	1	UICE700	Design of steel structure I	تصميم المنشآت الحديدية ١	English	3				1		2	62	88	150	6.00	C	UICE604
		2	UICE701	Reinforced Concrete Design III	تصميم الخرسانة المسلحة ٣	English	3				1		2	62	88	150	6.00	C	UICE601
		3	UICE702	Foundation Engineering I	هندسة الاس ١	English	2				2		2	62	63	125	5.00	C	UICE501
		4	UICE703	Transportation Engineering	هندسة المواصلات	English	2		2				3	63	62	125	5.00	C	UICE603
		5	UICE704	Project in Civil Eng. (1)	مشروع (١)	English	1		4				2	77	23	100	4.00	C	UICE603
		6	UICE705	CE Elective (1)	مادة أختيارية ١	English	3						2	47	53	100	4.00	E	
							Total	14	0	6	0	4	0	13	373	377	750	30.0	
UG IV	Eight	1	UICE800	Design of steel structure II	تصميم المنشآت الحديدية ٢	English	3				1		2	62	88	150	6.00	C	UICE700
		2	UICE801	Foundation Engineering II	هندسة الاس ٢	English	4						2	62	88	150	6.00	C	UICE702
		3	UICE802	Project in Civil Eng. (2)	مشروع (٢)	English	1		4				2	77	23	100	4.00	C	UICE704
		4	UICE803	Quantity Survey	المسح الكمي	English	2		2				2	62	63	125	5.00	C	UICE704
		5	UICE804	CE Elective (1)	مادة أختيارية (١)	English	3				1		2	62	63	125	5.00	E	
		6	UICE805	CE Elective (2)	مادة أختيارية (٢)	English	3				1		2	62	38	100	4.00	E	
							Total	16	0	6	1	2	0	12	387	363	750	30.0	
						Total	128	0	50	6	20	0	118	3178	2822	6000	240.0		Must be 240 ECTS
Note: The student should complete 4 weeks of Summer Internships to fulfil the requirements of the Bachelor's degree																			
Structured SWL (hr/w) type	CL	Class Lecture			Module type	B	Basic learning activities					SWL:	Student Workload						
	Lab	Laboratory				C	Core learning activity					SSWL:	Structured SWL						
	Pr	Practical Training				S	Suport or related learning activity					USSWL:	Unstructured SWL						
	Tut	Tutorial				E	Elective learning activity												
	Lect	Online lecture																	
Semn				Seminar			Note: Columns O, Q and R are progmaed, protected and should not be edited												

الملحق (2)
دليل البرنامج الدراسي
Program Catalog

Al-Iraqia University الجامعة العراقية



First Cycle – Bachelor's degree (B.Eng.) – Civil engineering

بكالوريوس هندسة - الهندسة المدنية



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1. Mission & Vision Statement

Vision Statement

To produce engineers having professional and leadership qualities with capacity to take up professional and research assignments in Civil Engineering and allied fields with focus on inter-disciplinary and innovative approach and to compete at the global level.

Mission Statement

- Create and develop sustained environment of learning, to nurture the students into highly skillful and ethical professionals by imparting quality education with social obligations.
- To establish collaborative partnerships with academic, research and industrial entities to provide a knowledge base for existing and emerging technologies to enhance the skills innovativeness, management skills and lifelong learning in civil engineering students.
- To provide students with the principles and methodologies needed for civil engineering practice and prepare students for leadership roles in Civil Engineering.

2. Program Specification

Programme code:	BEng-CE	ECTS	240
Duration:	4 levels, 8 Semesters	Method of Attendance:	Full Time

The goal of civil engineering is to design the constructed and natural environments that people live in. The structures that sustain and enclose us are at issue. It concerns how we develop in relation to the environment, how we protect ourselves from it, and how we protect the environment from us. In addition to having a high level of expertise, civil engineers must also be creative, inclusive, open-minded, and capable of taking charge when necessary. The Civil engineering program has been developed to give graduates an adequate technical foundation in all of the major fields of the modern Civil Engineering profession by delivering a coherent, coordinated, and balanced degree program that integrates fundamental engineering science with practical application. It will allow students to build a sophisticated understanding of the context in which engineering projects are generated. It will also help students improve their oral, written, and graphic communication skills. Students will be given enough time to investigate the topic, conduct self-directed study, and consider the concerns and challenges of the content, with additional time for self-directed study gradually increasing over the four years as a better preparation for professional practice. The curriculum covers all aspects of the highly complex field of civil engineering, including structural engineering, project management for building projects, and infrastructure facilities including sewage networks, dams, highways, and bridges. It also includes sanitary and environmental engineering as well as water resources engineering. And soil methods as well as contemporary geomatics engineering and remote sensing methods, in line with the Department's research units.

3. Program Goals

1. To equip students with the knowledge of analyzing data and technical concepts pertaining to the development of infrastructure, design, sustainability, construction management and any other field related to civil engineering.
2. To perform their/duties efficiently, effectively and ethically at individual level and also at group level in a multidisciplinary team, contributing to the welfare of the society.
3. To adopt a new innovative technology by continuously updating their knowledge through lifelong learning achieving the personal and organization growth.

4. Student Learning Outcomes

Upon successful completion of this program, graduates will typically have:

Outcome 1

An ability to identify, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

Outcome 2

An ability to communicate effectively with a range of audiences.

Outcome 3

An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

Outcome 4

An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

Outcome 5

An ability to develop and conduct appropriate experimentation analyzes and interprets data, and use engineering judgment to draw conclusions.

Outcome 6

An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

Outcome 7

An ability to acquire and apply new knowledge as needed, using appropriate learning strategies

5. Academic Staff

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6. Credits, Grading and GPA

Credits

Al Iraqia University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

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:				

Number 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.

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

CGPA of a 4-year B.Sc. degree:

$$\text{CGPA} = [(1^{\text{st}} \text{ module score} \times \text{ECTS}) + (2^{\text{nd}} \text{ module score} \times \text{ECTS}) + \dots] / 240$$

7. Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
HRAD103	Human Rights and Democracy	33	17	2.00	S	
UICE101	Engineering Mechanics I	63	112	7.00	C	
UICE102	Mathematics I	93	32	5.00	B	
UICE103	Construction Materials	63	62	5.00	C	
UICE104	Physics for Engineers	62	63	5.00	B	
UICE105	Engineering Drawing	63	37	4.00	C	
ENLA102	English language I	33	17	2:00	B	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
WORK110	Workshop technology	48	52	4.00	S	
ARLA101	Arabic language I	33	17	2.00	B	
UICE202	Engineering Mechanics II	63	62	5.00	C	UICE101
UICE203	Mathematics II	93	32	5.00	S	UICE102
UICE204	Engineering Geology	48	27	3.00	B	
UICE205	Computer Aided Graphics	63	37	4.00	C	

UICE206	Chemistry	63	37	4.00	B	
COMP105	Computer I	48	27	3.00	S	

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
COMP205	Computer II	48	27	3.00	S	COMP105
UICE301	Mechanics of Materials I	63	87	6.00	C	UICE102, UICE202
UICE302	Engineering Surveying I	78	47	5.00	C	
UICE303	Concrete Technology	78	47	5.00	C	
UICE304	Fluid Mechanics	63	62	5.00	C	
UICE305	Probability and Statistics	78	22	4.00	C	
ARLA201	Arabic language II	33	17	2.00	B	

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
UICE400	Engineering Surveying II	78	47	5.00	C	UICE302
UICE401	Mechanics of Materials II	63	112	7.00	C	UICE301
UICE402	Hydrology and Hydraulics	78	72	6.00	C	UICE304
UICE403	Building Construction	48	52	4.00	C	
UICE404	Engineering Management & Economics	48	52	4.00	C	
CBRI104	Crimes of the Baath Regime in Iraq	33	17	2.00	B	
ENLA202	English language II	33	17	2.00	B	

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
UICE500	Structural Analysis I	63	62	5.00	C	UICE301
UICE501	Soil Mechanics I	78	72	6.00	C	
UICE502	Engineering and Numerical Analysis	48	52	4.00	B	UICE203
UICE503	Building Services	48	52	4.00	C	

UICE504	Sanitary Engineering and Plumbing Design I	78	47	5.00	C	UICE304
UICE505	Reinforced Concrete Design I	63	87	6.00	C	UICE301

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
UICE600	Sanitary Engineering and Plumbing Design II	63	62	5.00	C	UICE304
UICE601	Reinforced Concrete Design II	63	87	6.00	C	UICE505
UICE602	Soil Mechanics II	78	72	6.00	C	UICE501
UICE603	Traffic Engineering	63	62	5.00	C	
UICE604	Structural Analysis II	63	62	5.00	C	UICE500
UICE605	Computer Applications in Civil Engineering	48	27	3.00	C	

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
UICE700	Design of steel structure I	63	87	6.00	C	UICE604
UICE701	Reinforced Concrete Design III	63	87	6.00	C	UICE601
UICE702	Foundation Engineering I	63	62	5.00	C	UICE501
UICE703	Transportation Engineering	63	62	5.00	C	UICE603
UICE704	Project in Civil Eng. (1)	78	22	4.00	C	
UICE705	CE Elective (1)	48	52	4.00	E	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
UICE800	Design of steel structure II	63	87	6.00	C	UICE700
UICE801	Foundation Engineering II	63	87	6.00	C	UICE702
UICE802	Project in Civil Eng. (2)	78	22	4.00	C	UICE704
UICE803	Quantity Survey	63	62	5.00	C	

UICE804	CE Elective (1)	63	62	5.00	E	
UICE805	CE Elective (2)	63	37	4.00	E	

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The logo of Al-Furat Al-Awsat University is a large, faint watermark in the background. It features a green archway with a blue silhouette of a person standing inside. Below the archway, the university's name is written in Arabic and English. The text 'الجامعة العراقية' (Al-Furat Al-Awsat University) is written in Arabic, and 'AL-FURAT AL-AWSAT UNIVERSITY' is written in English.

الملحق (3)
دليل المواد الدراسية
Modules Catalog

Al-Iraqia University الجامعة العراقية



First Cycle – Bachelor's Degree (B.Eng.) -Civil Engineering

بكالوريوس هندسة - هندسة مدنية



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1. Overview

This catalogue is about the courses (modules) given by the program of Civil Engineering to gain the Bachelor of Science degree. The program delivers (53) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظرة عامة

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج الهندسة المدنية للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (53) مادة دراسية، على سبيل المثال، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
HRAD103	Human Rights and Democracy	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17
Description			
The course provides an introduction to basic human rights philosophy, principles, instruments and institutions, and also an overview of current issues and debates in the field with focus on the problems specific to Iraq. This course aims to explore some aspects of the diverse and increasingly complex body of international law of human rights that has both national and international application. The course also seeks to analyze the ways in which allegations of human rights violations are dealt with in the Iraqi courts and the impact of human rights discourse on international politics and relations.			

Module 2

Code	Course/Module Title	ECTS	Semester
UICE101	Engineering Mechanics I	7	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	63	112
Description			
The main objective of a first course in mechanics should be to develop in the engineering student the ability to analyze any problem in a simple and logical manner and to apply to its solution a few, well-understood, basic principles. Analyze forces and find out the resultant forces in two and three dimensions. Differentiate between various type of supports and draw free-body-diagram, Compute the reaction force in simple structure (beam, frame, truss), Study Mechanism and laws of friction.as well as Equations of equilibrium, Equilibrium of a rigid body plane, solving equation of equilibrium plane, Equations of equilibrium, Equilibrium of a rigid body space, Solving problem of equilibrium space.			

Module 3

Code	Course/Module Title	ECTS	Semester
UICE102	Mathematics I	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	93	32
Description			
Mathematics is a broad field that encompasses various branches and concepts such as Functions: Functions are commonly represented as equations, graphs, or tables and are fundamental in describing relationships between variables. Derivatives: The derivative provides important information about the behavior of a function. Integration: Integration is the process of finding the area under a curve or calculating the accumulated sum of infinitesimally small quantities. Matrices: They are used to represent and manipulate data in various mathematical Operations, Determinants: They provide important information about the properties of matrices. Mathematics provides engineers with a powerful toolbox of analytical and problem-solving skills, enabling them to design, analyze, and optimize systems, predict behaviors, and make informed decisions. It forms the backbone of engineering principles and helps engineers tackle complex challenges across various engineering disciplines.			

Module 4

Code	Course/Module Title	ECTS	Semester
UICE103	Construction Materials	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
The construction materials course provides students with a comprehensive understanding of the fundamental properties, selection criteria, and applications of materials used in the construction industry. The syllabus focuses on key topics essential for a solid foundation in this field. The course begins with an introduction to the classification and characteristics of construction materials, including cementitious materials, masonry materials, metals and alloys, wood and timber products, asphalt and bituminous materials, plastics and composite materials, sustainable and innovative construction materials, material selection and specifications. Students will learn about the physical and mechanical properties, as well as the manufacturing processes and quality control methods associated with each material. Overall, this course equips students with the knowledge and skills necessary for effective material selection, assessment, and utilization in construction projects.			

Module 5

Code	Course/Module Title	ECTS	Semester
UICE104	Physics for Engineers	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
Physics is an essential subject for engineers of civil engineering as it provides the fundamental understanding of the physical principles that govern the behavior of structures, materials, and systems. Engineers can accurately design and test civil structures, ensuring that they are safe, efficient, and meet regulatory requirements. The course covers topics such as force, motion, thermodynamics, elasticity, and stress play a crucial role in designing and analyzing structures. These topics are essential for understanding the behavior of materials and structures, the forces that act upon them, and the various environmental factors that affect their performance. Engineering Physics also involves the use of experimental and computational techniques to design, test, and optimize civil engineering structures. Therefore, understanding the basics of physics is crucial for every civil engineer, enabling them to design structures that are safe, durable, and sustainable.			

Module 6

Code	Course/Module Title	ECTS	Semester
UICE105	Engineering Drawing	4	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	3	63	37
Description			
The engineering drawing class provides students with a comprehensive understanding of principles and techniques essential for creating and interpreting technical drawings. Students learn the standards and conventions of engineering drawing, develop skills in using traditional drafting tools and computer-aided design (CAD) software, and gain proficiency in generating accurate and precise drawings. The class covers topics such as orthographic projections, isometric projections, and dimensioning. Through a combination of lectures, practical exercises, and projects, students enhance their spatial visualization abilities, improve their communication of design requirements, and develop the skills necessary for the drafting.			

Module 7

Code	Course/Module Title	ECTS	Semester
ENLA102	English Language I	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17
Description			
The engineering drawing class provides students with a comprehensive understanding of principles and techniques essential for creating and interpreting technical drawings. Students learn the standards and conventions of engineering drawing, develop skills in using traditional drafting tools and computer-aided design (CAD) software, and gain proficiency in generating accurate and precise drawings. The class covers topics such as orthographic projections, isometric projections, and dimensioning. Through a combination of lectures, practical exercises, and projects, students enhance their spatial visualization abilities, improve their communication of design requirements, and develop the skills necessary for the drafting.			

Module 8

Code	Course/Module Title	ECTS	Semester
WORK110	Workshop technology	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	47	53
Description			

Preparing applied engineers in the field of engineering sciences who are distinguished by a high level of knowledge and technological creativity, in line with the strict standards adopted globally in quality assurance and academic accreditation of the corresponding engineering programs, while adhering to the ethics of the engineering profession. Enable the student to know and understand work systems, risks, and the factors surrounding them. Also, apply detailed understanding in proposal development and writing; use innovative knowledge in sourcing, analysing and presenting data; and apply research methodologies to undertake independent investigation and academic writing of a specialized topic.

Module 9

Code	Course/Module Title	ECTS	Semester
ARLA101	Arabic language I	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17
Description			
This course addresses the essential knowledge required for airport planning and design. It covers the topics on airport planning, airport terminal, signage, environmental issues, and pavement design. It is a technical elective course offers to Civil Engineering students. Furthermore, the students will become familiar with airport planning and design issues. During the course they will develop an understanding of professional skills relating to airport planning and design of all parts of airport to the point of being able to complete site investigation, as well as selection and preliminary design for a small general aviation airport and understand its relationship to local economic development.			

Module 10

Code	Course/Module Title	ECTS	Semester
UICE202	Engineering Mechanics II	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	63	62
Description			
This module studies the description of dynamics which is the branch of mechanics which deal with the motion of bodies under the action of forces. Obtain and centroid for deferent engineering shapes. Obtain moment of inertia for deferent engineering shapes. Understand the engineering applications that evolve dynamics. Solve engineering problems involving objects moving along a linear path , Simplify engineering problems involving objects moving along a curved path, Recognize and deal with projectile problems, Write the equation of motion of a moving object, Solve problems involving the force in accelerated bodies, Apply the theorem of conservation of energy to solve kinetic problems.			

Module 11

Code	Course/Module Title	ECTS	Semester
UICE203	Mathematics II	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	93	32
Description			
Mathematics encompasses a wide range of concepts and topics including: Methods of Integration; Integration is the process of finding the accumulated sum or the area under a curve. Multivariable Functions and Partial Derivatives: In many real-world situations, functions depend on multiple variables. It provides information about how a function varies in different directions. Differential Equations: A differential equation is an equation that relates a function to its derivatives. It describes the relationship between a function and its rate of change. Solving differential equations involves finding functions that satisfy the given equation, and this process often requires advanced mathematical techniques and methods. Integration, multivariable functions and partial derivatives, and differential equations are essential tools for engineers. They provide the mathematical framework for analyzing complex systems, optimizing designs, modeling dynamic behavior, controlling systems, and solving engineering problems across various disciplines.			

Module 12

Code	Course/Module Title	ECTS	Semester
UICE204	Engineering Geology	3	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	-	48	27
Description			
This module provides students with a comprehensive understanding of the principles and applications of engineering geology in civil engineering projects. It focuses on the study of minerals and rocks, physical and mechanical properties of soils, mineral composition, crystallography, and the formation of sedimentary and metamorphic rocks. Students also examine the physical and engineering properties of rocks and soils of Iraq. Structural geology is another key component, encompassing earth movements, erosion of rocks, mechanical behavior of soils and rocks under various loading conditions, and the influence of groundwater. By the end of the module, students will be equipped with the knowledge and skills to identify soils, classify them according to the USCS, and analyze the physical and engineering properties of rocks and soils. They will understand the mechanical behavior of soils and rocks under diverse loading conditions, and apply this knowledge to design foundations, slopes, and retaining structures. Additionally, they possess the ability to interpret topographic and geological maps.			

Module 13

Code	Course/Module Title	ECTS	Semester
UICE205	Computer Aided Graphics	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	3	63	37
Description			
Computer Aided Graphics It means The art of creating images with the help of a computer. The material is considered one of the programs that fall within the concept of computer-aided design (CAD), which will help the student in drawing speed and accuracy.so, let students have a clearly understand all the engineering properties of an entity or product. This course helps in the use of computer systems and software to contribute to the creation, modification, analysis or improvement of engineering designs. Computer design software is used to increase student productivity, improve design quality, improve communication through documentation, and create manufacturing databases. The outputs of computer design for the student are usually in the form of electronic files that can be printed, manufactured, or for other processes within the field of manufacturing or study. At the end of the semester, the student will be able to master the AutoCAD and Revit engineering programs.			

Module 14

Code	Course/Module Title	ECTS	Semester
UICE206	Chemistry	4	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	63	37
Description			
This course introduces the fundamental concepts of chemistry that are essential for understanding materials and processes used in civil engineering. It focuses on the chemical principles underlying construction materials, water treatment, corrosion, and environmental impact. Students will study the structure and properties of matter, chemical bonding, reactions, and thermodynamics as they relate to concrete, metals, polymers, and other engineering materials. Laboratory experiments reinforce theoretical concepts and develop practical analytical skills.			

Module 15

Code	Course/Module Title	ECTS	Semester
COMP105	Computer II	3	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	48	27
Description			

It involves using programming languages to communicate with computers and create software application. Such as learn about the basic components of a computer system, levels of Programming Languages, Including MATLAB: widely used in scientific and engineering fields for data analysis, visualization, and algorithm development. Conditional Statements and Loops: learn how to use these control structures to create efficient and flexible programs. Writing Programs to Solve Complex Problems: explore different techniques and strategies for problem-solving and practice applying them to real-world scenarios. Creating 2D and 3D Plots: learn how to create 2D plots, customize their appearance by adding labels, titles, and legends. Computer programming is vital for engineers as it enhances problem-solving abilities, automates tasks, enables data analysis and visualization, facilitates simulation and modeling, supports prototyping and development, empowers control systems and automation, promotes interdisciplinary collaboration, and fosters innovation and research.

Module 16

Code	Course/Module Title	ECTS	Semester
COMP205	Computer II	3	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	48	27
Description			
It involves using programming languages to communicate with computers and create software application. Such as learn about the basic components of a computer system, levels of Programming Languages, Including MATLAB: widely used in scientific and engineering fields for data analysis, visualization, and algorithm development. Conditional Statements and Loops: learn how to use these control structures to create efficient and flexible programs. Writing Programs to Solve Complex Problems: explore different techniques and strategies for problem-solving and practice applying them to real-world scenarios. Creating 2D and 3D Plots: learn how to create 2D plots, customize their appearance by adding labels, titles, and legends. Computer programming is vital for engineers as it enhances problem-solving abilities, automates tasks, enables data analysis and visualization, facilitates simulation and modeling, supports prototyping and development, empowers control systems and automation, promotes interdisciplinary collaboration, and fosters innovation and research.			

Module 17

Code	Course/Module Title	ECTS	Semester
UICE301	Mechanics of Materials I	6	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			
This course is considered one of the core subjects that the civil engineer must be familiar with its fundamentals to analyze and design solid bodies. The course outlines the concept of stress and strain, which enable the civil engineering student to calculate and design the size of structure members subjected to any type of loadings, without any failure or excessive deformation in the solid body. The mechanical			

properties are also introduced in this course and learn the relation between the stress and strain, and leads to the Hook's law, and Poisson's ratio. The course enables the students to calculate the axial deformation, and solve the indeterminate structures using the deformation formula, and study the effects of thermal stresses. The shear-moment diagram is presented in this module to locate and calculate the maximum shear and moment values along the slender beams and use the flexural and shear formulas to calculate the bending and shear stresses.

Module 18

Code	Course/Module Title	ECTS	Semester
UICE302	Engineering Surveying I	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
Engineering surveying as those activities involved in the planning and execution of surveying for the planning, design, construction, operation, and maintenance of engineered projects. Is a course that Giving the students fundamental concepts about surveying as science in general then teaching them the concepts of engineering surveying. Explain about Errors, mistakes and most probable value. Teaching them how to measure distances using simple instruments then modern ones and how to correct the measurements to get the desired accuracy, how to calculate the scale, and find the distance on a map or on the ground, explain obstacle in chaining, provides student with a comprehensive and understanding what elevations are and how to measure them and the importance of different types of levels, correcting elevations, sections both longitudinal and cross sections, to teach them about elevations and benchmarks, using level instrument, explain what benchmarks are and how to make them using different types of levels. This is the basic subject for all engineering surveying I.			

Module 19

Code	Course/Module Title	ECTS	Semester
UICE303	Concrete Technology	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	47
Description			
The Module is intended to help undergraduate and Civil Engineers to understand the theoretical and practical aspects of concrete technology. It includes the latest specifications and regulations of American and Iraqi Standards (ASTM, ACI and IQS) for concrete construction and mix design. The Module includes 5 units that provide an introduction to concrete structures, the properties and requirements of constituents of concrete, including the role of various admixtures to get special properties. The properties of fresh concrete and hardened concrete and the method of testing them is explained in detail. Concreting in hot weather, quality control.			

Module 20

Code	Course/Module Title	ECTS	Semester
UICE304	Fluid Mechanics	5	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
The importance of understanding the mechanics of fluids is apparent from when we turn on our kitchen faucets, thus activating flow through a network of pipes and valves, to when we drive our cars, which rest on pneumatic tires, have hydraulic shock absorbers, and pump gasoline through a complex piping system. In fact, our very existence depends on fundamental principles of fluid mechanics – the flow of blood through our bodies. A number of environmental, geotechnical and structural engineering problems are intimately linked to fluid mechanics as well. Consider, for example, the synergy of fluid principles in air pollution control, water and wastewater treatment, groundwater management and control, and the construction of dams and bridges. As a result, it is vital that civil engineers develop a basic foundation in the mechanics of fluids before investigating these and other similar problems.			

Module 21

Code	Course/Module Title	ECTS	Semester
UICE305	Probability and Statistics	4	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	78	22
Description			
The main objective of statistics is prediction, This makes it imperative for a civil engineer to know the future expectations of the engineering phenomena that occur and use them in his daily life in a large way, For example, the change in the strength of construction materials such as iron, concrete, brick and stone, the ability of the soil to bear the loads, the amount and speed of water flow in rivers and irrigation canals, as well as the study of traffic problems on roads Internal and external, in addition to traffic accidents and other known and important matters for every civil engineer.			

Module 22

Code	Course/Module Title	ECTS	Semester
ARLA201	Arabic language	2	3
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17
Description			

This course addresses the essential knowledge required for airport planning and design. It covers the topics on airport planning, airport terminal, signage, environmental issues, and pavement design. It is a technical elective course offers to Civil Engineering students. Furthermore, the students will become familiar with airport planning and design issues. During the course they will develop an understanding of professional skills relating to airport planning and design of all parts of airport to the point of being able to complete site investigation, as well as selection and preliminary design for a small general aviation airport and understand its relationship to local economic development.

Module 23

Code	Course/Module Title	ECTS	Semester
UICE400	Engineering Surveying II	5	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	47
Description			
The course aims to provide the students with necessary fundamental concepts about surveying as science in general then teaching them the concepts of engineering surveying. Teach them direction, azimuth bearing, and magnetic declination. And explain how to measure the horizontal and vertical angles and how to compute the unknown elevations and height of building, students learn to calculate all kinds of areas by different methods, and explain what the coordinate and traversing using theodolite instrument. provides student with a comprehensive and understanding about the topographic map and contour line and how to use topographic maps and draw contour lines. Students learn about GPS and EDM applications to determine apposition and knowledge about how satellites position objects on and above surface of the earth. And explain about GIS application to record information on the map, and analyze spatial data using GIS, and analyze toots to record information on the map.			

Module 24

Code	Course/Module Title	ECTS	Semester
UICE401	Mechanics of Materials II	7	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	63	112
Description			
The fundamentals learned in the first course is used to extend the study in the mechanics of the materials to learn the effects of torsion loadings, and the shear stresses developed internally. All the type of loadings are combined and the response is taken simultaneously to calculate the normal stresses. The stresses and strains that are associated with local axis in previous course are now transformed to new set of axes with different orientation. The course discusses various methods for determining the deflection and slope at specific points on beams and shafts. By completing the two courses of Mechanics of Materials the students will be able to go further in designing various types of structures such as reinforced concrete, steel, or timber. Taking into account the effects of all kinds of loadings and associated failures and deformations.			

Module 25

Code	Course/Module Title	ECTS	Semester
UICE402	Hydrology and Hydraulics	6	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
This course is designed to learn the analysis of the flow and pressure distribution of flowing water for many fundamental engineering tasks, such as sizing pipes between tanks and taps, picking pumps, and assuring a good flow distribution in waterworks. The students will be guided to learn how to solve such problems and how to think practically about the flow of water in engineered systems. The course will cover both pressurized and open-channel flow and the hydraulics of pipes, networks, channels, culverts, and spillways. Also, the course will include an Introduction to the stream flow Hydrograph and the calculation of the runoff of a site. The course is taught through a mix of three approaches: Classroom lectures to present the basic theory, problem-solving sessions where students put the theory to work in solving practical problems, and laboratory sessions where students will test the theory against their real hydraulic system observations.			

Module 26

Code	Course/Module Title	ECTS	Semester
UICE403	Building Construction	4	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	47	53
Description			
This module contains 4 units on various aspects of Building Construction. It is prepared with the objective to provide technical details on 'Formwork for Buildings' for the guidance of civil engineering students involved in planning, designing, construction and maintenance of buildings & other structures. It covers the functional requirements, design aspects, formwork construction and its safe removal, safety measures and Study implementation mechanisms and supervision of the construction phases of the structural (primary) and various which include (foundations, walls, floors, stairs and others). Knowledge of different materials to build and understand the composition of the Executive and requirements. The aim of this Module is to acquaint Civil Engineers, civil engineering students, Builders and Contractors etc. with basic principles for construction of buildings.			

Module 27

Code	Course/Module Title	ECTS	Semester
UICE404	Engineering Management & Economics	4	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)

2	1	48	52
Description			
The Program Specification provides a concise summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. The module type of program is core and the ECTS Credits are 4. The aim is preparing building and project management engineering students to work on the management of professional engineering practice. The weekly syllabus includes details of Construction Management principles and planning techniques, critical path methods and project scheduling in addition to linear programming and statistical quality control. The outcomes present knowledge of (project management, money management, financial planning, economic optimization) and knowledge of comparing an alternative of benefits and cost Project scheduling.			

Module 28

Code	Course/Module Title	ECTS	Semester
CBR104	Crime of the Baath Regime in Iraq	2	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	32	18
Description			
ارتكب نظام البعث في العراق إبّان حكمه عدداً كبيراً من الجرائم المختلفة، واختلافها يلزم بيان مفاهيم وتعريف للطلاب ليكون على معرفة ودراية بما يمر به مما لها علاقة بمادة المنهاج، كمفهوم الجريمة وأقسامها، والجرائم الدولية التي حكم عليها قيادات وأعلام نظام البعث وفق قانون المحكمة الجنائية العراقية العليا لقد تضمن هذا المنهج ما جاء مفاتيح معرفية بيد الطالب الجامعي يقرى بها على كلّ مرتج حبكت رواية أكوذوبته أيادي البعث وإعلامه المزيف، وباعت ضميرها أنفس تروى أنّ تبقى إلى الآن ذليلة أسيرة، وذيلة تابعة			

Module 29

Code	Course/Module Title	ECTS	Semester
ENLA102	English II	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	1	33	17
Description			
This module provides a comprehensive overview of key aspects of the English language relevant to civil engineering field. It focuses on English grammar basics, covering essential topics, it delves into technical English vocabulary and terminology related to civil engineering field, introducing technical collocations, compound words, idiomatic expressions, and industry-specific terms in the context of construction, structural engineering, geotechnical engineering, transportation engineering, and sanitary engineering. This module is designed to enhance student's general language skills, focusing on reading and writing. students will be exposed to the concept of lifelong learning, emphasizing the importance of utilizing online resources, industry publications, and professional development platforms to stay current in the field of civil engineering. By the end of the module, students will possess effective communication skills,			

a broad technical vocabulary, advanced reading comprehension abilities, proficient technical writing skills, and a commitment to continuous learning.

Module 30

Code	Course/Module Title	ECTS	Semester
UICE500	Structural Analysis I	5	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	63	62
Description			
Structural Analysis I is an essential course in engineering disciplines, specifically for those pursuing careers in civil and structural engineering. This course provides the foundation for understanding how various structures respond to different loads. Students learn essential techniques such as the method of joints and sections, which are used for computing internal forces and moments in simple structures. This knowledge is not just theoretical; it has real-world applications, helping engineers design and analyze everyday structures like buildings, bridges, and tunnels. The course also promotes problem-solving skills, requiring students to apply the principles of statics and mechanics of materials to solve complex structural problems. Safety considerations are a key component of the course, providing students with the knowledge needed to design structures that can safely bear different loads. Some courses may also introduce students to industry-standard software tools used in structural analysis, giving students early exposure to tools they will use in their careers. In summary, Structural Analysis I is a pivotal course that introduces fundamental concepts and techniques in structural engineering, promoting a deep understanding of structural behavior, problem-solving skills, and a focus on safety.			

Module 31

Code	Course/Module Title	ECTS	Semester
UICE501	Soil Mechanics I	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
The essential physical and analytical understanding of soil mechanics is important to function for civil engineer. Student completing this course will has background to higher level courses involving soil mechanics, seepage and soil testing. At the end of the class, the student will be able understand and define the basic soil properties; especially particle-size, density and specific gravity. Also understanding the weight-volume relations defining the soil properties, and be familiar with engineering soil classification systems such as unified soil classification system used by civil engineers and AASHTO classification system which is used in the roads design. Understand the concept of soil compaction and factors affecting compaction which help civil engineer to evaluate the compaction works in the field. Also, learning about field and laboratory measurement of density and compaction techniques used in large projects.			

Module 32

Code	Course/Module Title	ECTS	Semester
UICE502	Engineering and Numerical Analysis	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	52
Description			
Numerical methods are indispensable to engineers as they provide tools for solving complex problems. They are essential for tackling real-world engineering challenges and enabling accurate and efficient engineering analysis and design. It carried out on: Modified Euler Method: Is a numerical method used to approximate the solutions of ordinary differential equations (ODEs), Gaussian Elimination Method: It involves systematically performing row operations to transform the system into an equivalent triangular system, Gauss-Jordan Elimination Method: This method allows for the direct extraction of solutions, making it useful for solving linear systems and finding matrix inverses, Jacobi Method: Is often used for large systems and parallel computing, (Gauss-Seidel, Runge-Kutta, Newton-Raphson) Methods are the iterative techniques for solving systems. Laplace Convolution Theorem: This theorem is particularly useful for solving linear differential equations and analyzing systems. Trapezoidal Rule and Simpson's Rule: These are numerical integration techniques used to approximate the definite integral of a function.			

Module 33

Code	Course/Module Title	ECTS	Semester
UICE503	Building Services	4	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	-	48	52
Description			
Building services is interested with the built environment aspects that assure wellbeing of people that use the buildings through providing all ways of services. These services that should be involved are ventilations, air conditioners, electrical powers and lights, fire extinguisher and safety engineering, thermal and acoustic insulation, transportations and routine evaluation of buildings. These should serve the buildings that could be private, popular building for example: houses, schools, governmental offices, hospitals, traditional such as malls, supermarkets....etc. the maintenance and management these services could ensure the lifespans of these buildings over lifecycles. Therefore, the building service module enrich the students with the knowledge and skills related to buildings services. Through the acquired knowledge, the student will be able to develop the techniques and solve engineering problems that related to the building services.			

Module 34

Code	Course/Module Title	ECTS	Semester
UICE504	Sanitary Engineering and Plumbing Design I	5	5

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	77	48
Description			
Water treatment is a vital process that ensures the availability of clean, safe, and potable water for human consumption and various industrial applications. It involves the removal of contaminants, such as bacteria, viruses, chemicals, and impurities from water sources, including rivers, lakes, and groundwater. The treatment process typically includes several steps, including coagulation, flocculation, sedimentation, filtration, disinfection, and sometimes desalination. Coagulation involves the addition of chemicals to water, causing impurities to clump together. Flocculation helps the formation of larger particles, which settle during sedimentation. Filtration removes remaining suspended particles through various media layers. Disinfection kills or inactivates disease-causing microorganisms, typically achieved through chlorination, ultraviolet light, or ozone treatment. Desalination is utilized in areas with limited freshwater resources, where salt is removed from seawater or brackish water.			

Module 35

Code	Course/Module Title	ECTS	Semester
UICE505	Reinforced Concrete Design I	6	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	62	88
Description			
This is a core course which will provide an understanding and ability to analyze and design reinforced concrete structural elements. Among the topics discussed are objective and methods of design, code of practice, analysis and design of sections for moments and shear, checking for deflection and cracking, durability and detailing requirements, design of simply supported and continuous beams, design of one way restrained and simply supported slab. Furthermore, the students will be exposed to the concept of rectangular concrete sections which covers topics on principle and methods of design and analyzing. Moreover, serviceability and cracking control.			

Module 36

Code	Course/Module Title	ECTS	Semester
UICE600	Sanitary Engineering and Plumbing Design II	5	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	77
Description			
Wastewater engineering is a vital field focused on managing and treating wastewater to protect public health and the environment. It involves designing and implementing systems to collect, transport, and treat wastewater, ensuring its safe disposal or reuse. Wastewater engineers employ various technologies such as sewage treatment plants, filtration systems, and biological processes to remove pollutants and contaminants from wastewater before it is released back into the environment. On the other hand,			

plumbing engineering plays a crucial role in designing efficient and reliable plumbing systems for buildings and infrastructure. Plumbing engineers work to ensure the safe and effective distribution of water, as well as the proper disposal of wastewater. They consider factors such as water supply, piping networks, fixture selection, and drainage systems, while adhering to building codes and regulations.

Module 37

Code	Course/Module Title	ECTS	Semester
UICE601	Reinforced Concrete Design II	6	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	62	88
Description			
The aim of this course is to provide students with a thorough understanding of the design of reinforced concrete structures. Topics covered will include: design of beams and slabs for flexure and shear; detailing of flexural and shear reinforcement; behavior of reinforced concrete members under combined flexure and axial load; Design of an Edge Supported Two-way Solid Slab Including Analysis and Design of Supporting Continuous Beams; Analysis of a Column with Compression Load Plus Uniaxial Moment as well as Analysis and Design for Torsion, and fulfill the ACI code requirements to design of shear and torsional members. Also, ACI Analysis Procedure for a Short Column under an Axial Load (Small Eccentricity) is covered.			

Module 38

Code	Course/Module Title	ECTS	Semester
UICE602	Soil Mechanics II	6	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	72
Description			
Understanding of the basic concepts of soil mechanics is essential in the design of foundations for structures, retaining walls, tunnels, excavations, earth fills, stability of earth slopes, sanitary landfill, and environmental remediation projects. Specifically, a student completing this course will understanding the basic principles of soil mechanics and geotechnical engineering, and also learn the relevant terms of soil tests needed to describe and predict the behavior of a soil, permitting the student to work effectively with the specialist in engineering geotechnical. Also, the student will be able to solve fundamentals problems related to the flow of pore water, compression and consolidation, and shear strength of soil as required in geotechnical design.			

Module 39

Code	Course/Module Title	ECTS	Semester
UICE603	Traffic Engineering	5	6

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	62	63
Description			
The course aims to provide students with a comprehensive understanding of traffic flow principles, traffic characteristic measurements, and their interpretation for infrastructure changes or development. It also focuses on the design of traffic signal timing, including urban traffic control, through numerous work examples. The module aims to evaluate the importance of road safety and driver behavior in accident prevention. It promotes interdisciplinary approaches to solving engineering problems and emphasizes the need for collaboration with other disciplines in formulating policies to address urban traffic congestion. The learning outcomes of the course include understanding the design of traffic signal timing programs, performing necessary traffic studies for infrastructure changes, exposing students to interdisciplinary problem-solving approaches, conceptualizing driver behavior for engineering solutions, appreciating input from other disciplines in formulating congestion solutions, and engaging in discussions and debates on urban congestion solutions.			

Module 40

Code	Course/Module Title	ECTS	Semester
UICE604	Structural Analysis II	5	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	62	63
Description			
Structural Analysis II is a pivotal course in engineering curricula, extending the foundational knowledge gained from Structural Analysis I. This course introduces advanced techniques for analyzing indeterminate and complex structures, and considers a variety of loading conditions, enhancing problem-solving and critical thinking skills. It often includes learning advanced software tools, vital for modern engineering professions. Furthermore, it acts as a springboard into specialized fields such as seismic design or structural dynamics and provides essential preparation for subsequent design courses. In essence, Structural Analysis II deepens the understanding of how different forces interact within structures, critical for predicting a structure's behavior and ensuring its safety and reliability. This course is key for any aspiring civil or structural engineer.			

Module 41

Code	Course/Module Title	ECTS	Semester
UICE605	Computer Application in Civil Engineering	3	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	47	28
Description			

Modern structural engineers are expected to design structures that are not only safe and stable, but also it is required to consume the time. Therefore, this module is concerned with the analysis and design of steel, reinforced concrete and composite construction, focusing on multi-storey buildings using ETABS and SAFE software. In this module, students develop the skills to evaluate the structural design process from the brief to the construction stage, including essential aspects related to structural integrity, constructability and health and safety. To effectively work with design codes, engineers must understand the underpinning fundamentals of structural design to available codes, including global and member stability, analysis and design methods. Fundamental concepts related to the performance-based design of structures.

Module 42

Code	Course/Module Title	ECTS	Semester
UICE700	Design of steel structure I	6	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	63	87
Description			
Steel design module is concerned to provide students with knowledge and skills related to steel structures analysis and design. Understanding the behavior of steel structure fundamental principles considers a crucial to know the problems and engineering solutions. This course studies the analysis and design of steel structure and the main problems that could occur in steel structures. Moreover, the design criteria and standard also will be known. In addition to that, mechanical properties of steel structure, design of actions and all steel members in tension, compression, shear, torsion, flexure and combined with all types of connections between members. At the end of this course, students will be able Demonstrate the Engineering principles in steel structure design, apply the engineering principles to realistic cases, demonstrate the Engineering principles in steel structure design, apply the engineering principles to realistic cases, Explicate the results of the design, design of Steel Structural Members, solve engineering problems that related to steel structures, consider Health and Safety Aspects to the steel structures design			

Module 43

Code	Course/Module Title	ECTS	Semester
UICE701	Reinforced Concrete Design III	6	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87
Description			
Reinforced concrete Design is an introductory course in civil engineering. In this course, basic elements governed by bending, shear, axial forces or combination of them are identified and are considered as slender columns and slabs. Different methods of design will be briefly described before introducing the limit states of collapse and serviceability. As the result, the student will be able to apply design method, codes, specification and standard that govern the structural design of reinforced concrete members.as well as design and detail of main structural members in concrete buildings and satisfy the strength and serviceability. Also, Demonstrate the framing structure to ensure that complete load path exist for all loads and forces and their combination.			

Module 44

Code	Course/Module Title	ECTS	Semester
UICE702	Foundation Engineering I	5	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
This course on Foundation Engineering provides the students necessary geotechnical engineering skills to learn how to utilize their knowledge in soil mechanics to perform various types of engineering calculations. This includes consolidation analysis for foundations and stability analysis of slopes and retaining walls. Student completing this course will has background to higher level courses involving site exploration and soil investigation. Also, learns design of the shallow foundations under different loading and soil conditions by considering bearing pressure, bearing capacity and settlement criteria. Also, ability to calculate the lateral loads acting on an earth retaining structure by using lateral earth pressure theories. Finally, in this course the student will discuss and evaluate the feasibility of foundation solutions to different types of soil conditions considering the time effect on soil behavior.			

Module 45

Code	Course/Module Title	ECTS	Semester
UICE703	Transportation Engineering	5	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
The module aims to provide students with the necessary knowledge and skills to analyze, design, and construct road pavements. It focuses on several key objectives, including the analysis of road pavement structures, differentiation between different types of materials used, the design of road pavements based on design concepts and performance criteria, and the principles of geometric design. The learning outcomes of the module include the ability to select appropriate materials for different road layers, evaluate the quality and performance of road materials, perform road pavement design and analysis, develop road monitoring and maintenance programs, interpret geometric design fundamentals for safety and driver comfort, and design a road alignment. The module covers various topics such as transportation engineering introduction, unbound flexible pavement materials, bitumen properties and testing, different types of bituminous materials, flexible pavement design principles and examples, rigid pavements, and geometric design fundamentals.			

Module 46

Code	Course/Module Title	ECTS	Semester
UICE704	Project in Civil Eng. (1)	4	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	77	23
Description			
This course is concerned with acquiring knowledge in planning, preparing, analysis, designing, communication and implementation of different aspects of different fields of research studies. The special skills will be acquired from the research whether this research is laboratory work or practical field work or a desk-based study. The research study could be novel or executed ideas with developing these ideas. At the end of this course, students will be able to select the proper research area with either problem cases or innovative ideas. Moreover, creative a plan to achieve the project, determination of type of methods analysis of data collection, Relate the acquired information with the previous acquired knowledge obtained from their study and based on area of the study.			

Module 47

Code	Course/Module Title	ECTS	Semester
UICE705	CE Elective (1)	4	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	-	48	52
Description			
1- Sustainable buildings: This module explores sustainability principles and their practical application in the construction industry. Topics include sustainable development, environmental impacts (resources, waste, energy, climate change), social impacts (Corporate Social Responsibility, responsible sourcing, poverty reduction), and assessment methods (indicators, life-cycle assessment, cost analysis). Through lectures, case studies, and discussions, students develop a comprehensive understanding of sustainability and its relevance to construction industry. They learn to evaluate sustainability performance and make informed decisions. This module equips students with the knowledge and skills to contribute to sustainable development and apply sustainable practices in transport infrastructure engineering and construction. 2- GIS: This course introduces the principles and applications of Geographic Information Systems (GIS) in civil engineering. It focuses on the acquisition, management, analysis, and visualization of spatial data to support engineering decision-making and infrastructure planning. Students will learn how to use GIS software to collect and analyze geospatial data related to land use, transportation networks, water resources, and environmental systems. 3- Environmental Engineering: to civil engineering practice. It focuses on the protection and improvement of environmental quality, emphasizing the interaction between human activities and the natural environment. Topics include water and wastewater treatment, solid waste management, air pollution control, environmental impact assessment, and sustainable development. Students will learn how to design systems and processes that minimize pollution, conserve resources, and promote public health.			

Module 48

Code	Course/Module Title	ECTS	Semester
UICE800	Structural Steel Design II	6	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	63	87
Description			
Steel design module is concerned to provide students with knowledge and skills related to steel structures analysis and design. Understanding the behavior of steel structure fundamental principles considers a crucial to know the problems and engineering solutions. This course studies the analysis and design of steel structure and the main problems that could occur in steel structures. Moreover, the design criteria and standard also will be known. In addition to that, mechanical properties of steel structure, design of actions and all steel members in tension, compression, shear, torsion, flexure and combined with all types of connections between members. At the end of this course, students will be able Demonstrate the Engineering principles in steel structure design, apply the engineering principles to realistic cases, demonstrate the Engineering principles in steel structure design, apply the engineering principles to realistic cases, Explicate the results of the design, design of Steel Structural Members, solve engineering problems that related to steel structures, consider Health and Safety Aspects to the steel structures design			

Module 49

Code	Course/Module Title	ECTS	Semester
UICE801	Foundation Engineering II	6	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	1	63	87
Description			
This course on Foundation Engineering allows the students to identify geotechnical hazards, assess the risk of them occurring, and produce engineering solutions to foundation problems. This course provides students with exposure to the systematic methods for designing foundations and build the necessary theoretical background for design and construction of foundation systems. This includes consolidation analysis for foundations, and stability analysis of slopes and retaining walls. Also, design and analysis of deep foundations and evaluate pile capacity in the field and identify major deep foundation types and calculate skin and tip capacity of piles in clay and sand. Also studying piles material types for various applications. Finally, this course will enable engineers to make the appropriate decision and determine the type of foundation required for buildings, as well as identifying site problems and find appropriate solutions for them.			

Module 50

Code	Course/Module Title	ECTS	Semester
UICE802	Project in Civil Eng. (2)	4	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	4	77	23
Description			
This course is concerned with acquiring knowledge in planning, preparing, analysis, designing, communication and implementing of different aspects of different fields of research studies. The special skills will be acquired from the research whether this research is laboratory work or practical field work or a desk-based study. The research study could be novel or executed ideas with developing these ideas. At the end of this course, students will be able to relate theoretical aspect with practical aspect and with literature, implement the evaluating methods, to manage and implement the plan of the research project, to analyze and explain the collected data, interpret the research data, solve engineering problem cases, and summarize findings in the reasonable way.			

Module 51

Code	Course/Module Title	ECTS	Semester
UICE803	Quantity Survey	5	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
This Program provides a summary of the main features of the program and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. The module type of program is core and the ECTC Credits are 5. The aims are developments in scientific and technical progress in their field of specialization and Special care for outstanding students and enabling them to put forward their idea in addition to providing the student with high skill and the ability to solve problems and teamwork. The weekly syllabus includes details of quantity survey introductions, approximate estimate and detailed estimate. In addition to exams. The learning outcomes present the ability to add knowledge in the fields of engineering science and project management, also, the ability to add knowledge in the areas of quantity survey, and contracts management.			

Module 52

Code	Course/Module Title	ECTS	Semester
UICE804	CE Elective (1)	5	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	-	63	62
Description			
Bridge design: This course introduces the fundamental principles, analysis, and design of bridges in civil engineering. Students will study different types of bridges, including beam, arch, truss, suspension, and cable-stayed bridges. The course focuses on structural behavior under various loads such as dead loads, live loads, wind, and seismic forces. Topics include materials used in bridge construction, load distribution, design codes and standards, and the use of computer software for bridge analysis and modeling. Students will also learn about construction methods, inspection, maintenance, and rehabilitation of bridge structures.			

Module 53

Code	Course/Module Title	ECTS	Semester
UICE805	CE Elective (2)	4	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	-	63	37
Description			
Airports Engineering: This course introduces the principles of planning, design, construction, and maintenance of airport facilities. It covers the fundamental aspects of airport layout, runway and taxiway design, terminal planning, and air traffic considerations. Students learn how to apply civil engineering concepts to meet the functional, safety, and operational requirements of modern airports. The course also includes topics such as aircraft characteristics, geometric design standards, pavement design for airfields, drainage systems, lighting, and markings. Environmental and economic factors affecting airport location and development are also discussed. Water Resources Engineering: This course focuses on the study, development, and management of water resources to meet human and environmental needs. It introduces the hydrologic cycle and its components, including precipitation, evaporation, infiltration, surface runoff, and groundwater flow. Students learn the principles of hydrology, hydraulics, and water management systems used in designing dams, reservoirs, canals, and water distribution networks. The course also emphasizes sustainable water use, flood control, irrigation systems, and the impact of climate change on water resources.			

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الملحق (4)
وصف المادة الدراسية
Module Description
Form

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Structural Analysis I		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	UICE604		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	6
Administering Department	-	College	-
Module Leader	Lec.Yasir Wisam Abduljaleel	e-mail	yasiraliris@gmail.com
Module Leader's Acad. Title	lecture	Module Leader's Qualification	MSc
Module Tutor	-	e-mail	-
Peer Reviewer Name	Dr.Mohanad Hatem	e-mail	mohshadhar@gmail.com
Scientific Committee Approval Date	11/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mechanics of Materials II	Semester	4
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. This course has been designed for undergraduate (civil) engineering students or those interested in developing a deeper understanding of introductory structural analysis concepts and methods. 2. Familiarize with the general stiffness matrix methods and their application in structural analysis. 3. Apply theoretical concepts to practical examples and real-world engineering problems in order to enhance problem-solving skills. 4. Develop a comprehensive understanding of structural analysis techniques and their role in designing safe and efficient structures. 5. Enhance critical thinking and analytical skills through the application of different structural analysis methods. 6. Describe the essential concepts and methods of structural analysis and provide examples demonstrating their applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the fundamental concepts and principles of structural analysis and design. 2. Apply mathematical and physical principles to analyze and predict the behavior of different types of structures. 3. Analyze the internal forces, stresses, and deformations within structures under various loading conditions. 4. Determine the stability and safety of structures by evaluating factors such as stability, equilibrium, and material strength. 5. Demonstrate proficiency in using structural analysis software and tools to model and analyze complex structures. 6. Evaluate the performance and behavior of structural elements such as beams, columns, trusses, and frames. 7. Interpret and apply relevant design codes, standards, and regulations to ensure safe and reliable structural designs. 8. Develop critical thinking and problem-solving skills to address real-world structural engineering challenges. 9. Communicate effectively and present technical information related to structural analysis and design through oral and written means.
Indicative Contents المحتويات الإرشادية	Indicative Content Includes the Following: <u>Part A -Equilibrium, Stability and Determinacy of structures</u> • Review of shear force and bending moment diagram in beams and frames. • Trusses and Frames Analysis of statically determinate. • Plane truss: method of joints and method of sections. • Deflection of truss: Method of virtual work. • Moment area method, conjugate beam method and virtual work method. • Deflection of beams and frames: Moment area method, conjugate beam method and virtual work method. • Influence line diagram and moving loads [32hrs] <u>Part A - Analysis of statically indeterminate structures</u> • Plane truss using method of consistent deformations. • Beams and Frames: Method of consistent deformations. • Beams and Frames: Moment distribution method. • Beams and Frames: Slope deflection method.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: Core concepts and theories are presented to students during lectures, often supplemented with slides, diagrams, and videos for better understanding. 2. Tutorials/Workshops: Tutorials or workshops provide opportunities for students to apply lecture material to solve problems, analyze case studies, and interact with instructors or tutors for additional guidance and clarification. 3. Problem-Based Learning: Assignments or projects may be given to students, often based on real-world scenarios, to apply their knowledge and develop critical thinking and problem-solving skills. 4. Group Projects: Collaboration on group projects encourages teamwork and communication skills. It can also provide a platform for peer-to-peer learning. 5. Self-Directed Learning: Students are encouraged to review lecture materials, read recommended textbooks and resources, and practice problem solving in their own time. This enhances their understanding and retention of the course material. 6. Online Learning Platforms: The use of online learning management systems, such as Moodle or Blackboard, can provide additional learning resources, enable online discussions, and allow students to access lecture materials and assignments at their own pace. 7. Guest Lectures/Seminars: Professionals from the industry or academia may be invited to give talks on specific topics, sharing their expertise and practical experiences. 8. Formative Assessment and Feedback: Regular quizzes or tests can be used to assess student understanding and provide feedback. This helps students identify areas they need to focus on and helps instructors adjust teaching strategies as necessary. 9. Field Trips: Visits to construction sites or structural engineering firms can provide a practical perspective on how structural analysis principles are applied in the real world. These learning and teaching strategies aim to promote active engagement, apply theoretical concepts in a practical context, and develop the skills necessary for future professional practice in Civil Engineering.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	62	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	63	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, and 7
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 7
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	
Week	Material Covered
Week1	Equilibrium, Stability and Determinacy of structures, Review of shear force and bending moment diagram in beams and frames
Week 2	Stability And Determinacy of Beams, Trusses and Frames Analysis of statically determinate structures, Plane truss: method of joints and method of sections
Week 3	Analysis of statically determinate structures, Deflection of truss: Method of virtual work
Week 4	Analysis of statically determinate structures, Deflection of beams and frames: Moment area method, conjugate beam method and virtual work method
Week 5	Analysis of statically determinate structures, Deflection of beams and frames: Moment area method, conjugate beam method and virtual work method
Week 6	Analysis of statically determinate structures, Influence line diagram and moving loads
Week 7	Continued

Week 8	Analysis of statically indeterminate structures, Plane truss using method of consistent deformations
Week 9	Analysis of statically indeterminate structures, Beams and Frames: Method of consistent deformations
Week 10	Continued
Week 11	Analysis of statically indeterminate structures, Beams and Frames: Moment distribution method
Week 12	Analysis of statically indeterminate structures, Beams and Frames: Slope deflection method
Week 13	Continued
Week 14	Cables And Arches
Week 15	Continued
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Fundamentals of Structural Analysis (Fifth Edition) by Kenneth M. Leet et al. 2018	Yes
Recommended Texts	2. Structural analysis (Eighth Edition) by R.C. Hibbeler 2012	Yes
Websites	1. https://www.udemy.com/course/structural-analysis-i/	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Soil Mechanics I		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UICE501			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	3	Semester of Delivery		5
Administering Department	-	College	-	
Module Leader	Reem Siham Tawfeeq		e-mail	engreemsiham86@gmail.com
Module Leader's Acad. Title	Assistant Lecture		Module Leader's Qualification	MSc
Module Tutor	-		e-mail	-
Peer Reviewer Name	Dr. Bilal Muassar		e-mail	bilal.muassar@aliraqia.edu.iq
Scientific Committee Approval Date	11/ 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	1. Identify methods for calculating engineering soil properties and bearing capacity 2. Knowledge of the importance of engineering soil properties and their behavior on engineering facilities 3. Identify the types of foundations, their characteristics, and the extent of their resistance to loads 4. Knowing the effect of water on the behavior of soil and foundations 5. Familiarity with the impact of the surrounding environmental conditions on soil behavior 6. Know how to classify soil type engineering 7. Knowing how to test the soil in the laboratory and its validity for the work of building over it 8. Treating the soil in case it fails under the influence of the loads placed on it
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Familiarity of soil properties 2. Knowledge of the engineering behavior of soil when subjected to loads and stresses 3. Identify the most important engineering problems facing soil and ways to treat or control them 4. Avoid soil failure or collapse by knowing the methods of soil replacement, compaction, or soil injection with chemicals and regular cement. 5. Transforming the relationship between the soil and the source into mathematical relations that the engineer can use in designing the structural elements 6. Achieving economics in engineering design 7. Providing a safety factor in engineering design 8. Familiarity with effects of the surrounding conditions on soil engineering properties.
Indicative Contents المحتويات الإرشادية	Particle size analysis; Soil description and classification. [15 hrs] Phase relationships. [15 hrs] Soil compaction. [15 hrs] Field measuring of density. [15 hrs] Seepage and what is soil water. [15 hrs] Permeability. [15 hrs] Field permeability measuring. [15 hrs] Seepage theory; Flow nets; Seepage in anisotropic. [15 hrs] Nonhomogeneous soils and through embankment dams. [15 hrs] Effective stress; and Influence of seepage on effective stress. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in presenting this unit is to provide interactive lectures and conduct laboratory experiments on soil samples brought from real work sites. As well as conducting field visits to engineering work sites and linking them with the information that the student receives in the semester.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	77	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	73	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	Particle size analysis
Week 2	Soil description and classification
Week 3	Phase relationships
Week 4	Soil compaction
Week 5	Density of soil
Week 6	Mid-term Exam
Week 7	Field measuring of density
Week 8	Seepage and what is soil water
Week 9	Permeability
Week 10	Field permeability measuring
Week 11	Seepage theory
Week 12	Flow nets; Seepage in anisotropic
Week 13	Nonhomogeneous soils
Week 14	Effective stress; and Influence of seepage on effective stress
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1	Lab 1: Sieve Analysis
Week 2	Lab 2: Moisture Content
Week 3	Lab 3: Specific Gravity of Soil
Week 4	Lab 4: Liquid and Plastic Limit of Soil
Week 5	Lab 5: Shrinkage Limit of soil
Week 6	Lab 6: Hydrometer Analysis
Week 7	Lab 7: Field density of soil

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Principles of Geotechnical Engineering Eighth Edition, SI BRAJA M. DAS, KHALED SOBHAN.	Yes
Recommended Texts	1. Soil mechanics by Lambe, T. William; Whitman. 2. B. M. Das, " Principles of Foundation Engineering" Eighth Edition,	Yes
Websites	https://csmrs.gov.in/content/18_1_SoilMechanics.aspx	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering and Numerical Analysis		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UICE502		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	UGIII	Semester of Delivery	Five
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Reem Siham Tawfeeq		e-mail: engreemsiham86@gmail.com
Module Leader's Acad. Title	Assistant lecture	Module Leader's Qualification	Master degree
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Dr. Bilal Muiassar	e-mail	bilal.muasser@aliraqia.edu.iq
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics I	Semester	1
Co-requisites module	Mathematics II	Semester	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Introducing the student to the skills of scientific mathematical foundations and learning solutions to engineering problems using multiple numerical and engineering methods. 2. Identify design and analysis using numerical methods 3. Calculation of quantities approximate manually by numerical equations 4. Study numerical equations and their use in engineering applications 5. Using numerical methods in calculating the engineering safety coefficient 6. Calculating changes that may occur in design or engineering works, by numerical methods 7. Studying the effect of the time factor on numerical calculation methods 8. Knowing the importance of the sequence of solving numerical equations in some engineering calculations and applications 9. Studying some practical applications related to engineering phenomena or problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student's understanding of mathematical theories and laws that enable the student to apply them in the fields of civil engineering 2. The student acquires the skill of thinking and analysis using numerical methods 3. - Enabling the student to quickly calculate or analyze quantities mathematically 4. Make the student able to accurately calculate the amount of engineering damage using numerical equations 5. - Predicting the percentage of error that may accompany engineering works and thus calculating the safety coefficient 6. Preparing the student to deal with any change that may occur in the statistical works related to the engineering aspect of the work, such as bills of quantities or spare orders. 7. Make the student able to deal with the timetables related to the implementation of the engineering paragraphs and their sequence 8. Enable student to think and analyze engineering phenomena and their applications 9. Enable student to think and analyze topics related to solving practical problems.
Indicative Contents المحتويات الإرشادية	Modified Euler, Milnes Predictor –corrector method. [10 hrs] Gaussian elimination Method, Gauss-Jordan elimination Method. [10 hrs] Jacobi Method (Indirect Methods to solve Linear Equations Systems) . [10 hrs] The Gauss-Seidel Method. [10 hrs]

	Numerical method of Rung-Kutta method. [10 hrs]
	Numerical solution of equation one variable location of root, Newton Raphson method. [10 hrs]
	The Laplace transform and Inverse Laplace transforms, Convolution theorem. [10 hrs]
	Numerical methods for solving integration: Trapezoidal rule, Simpsons rule. [10 hrs]
	Interpolation Curve Fitting: Method of least Square. [10 hrs]
	Numerical Analysis: Finite Differences. [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Interactive lectures for students and holding panel discussions with them and asking them for periodic reports and seminars throughout the semester and for various topics related to civil engineering calculations using numerical methods

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	53	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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	20% (20)	3, 8	LO #1, 4, and 7
	Assignment	2	10% (10)	2,9	LO #2, 6 and 8
	Report	1	10% (10)	13	LO #3, 5 and 9
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1- 6
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Ordinary Differential equation.
Week 2	Second order differential equation;
Week 3	Higher order differential equation
Week 4	Fourier Series :, Fundamentals, odd and even functions
Week 5	Application in Mechanical Vibration: system of differential equations : Un damped vibration of cabled system
Week 6	Partial differential Equations and Boundary value Problems
Week 7	One Dimensional wave equation and Solutions of one dimensional heat equation
Week 8	Power Series Solutions of differential Equations
Week 9	Mid-term Exam
Week 10	Modified Euler method and Jacobi Method
Week 11	Gauss-Jordan elimination Method
Week 12	Numerical method of Rung-Kutta method
Week 13	Newton Raphson method
Week 14	Interpolation
Week 15	Mid-term Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Epperson JF. An introduction to numerical methods and analysis. John Wiley & Sons; 2013 Jun 6.	Yes
Recommended Texts	Numerical Analysis, ninth edition Richard L. Burden. Youngstown State University.	Yes
Websites	https://www.math.hkust.edu.hk/~machas/numerical-methods.pdf	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Building Services and maintenance		Module Delivery	
Module Type	Elective		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UIC503			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	3	Semester of Delivery		5
Administering Department	-	College	-	
Module Leader	Dr. Omar Riyadh Khaleel		e-mail	dr.omaralobaidi@gmail.com
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	Ph.D.
Module Tutor	-		e-mail	-
Peer Reviewer Name	Dr. Mohanad Hatem		e-mail	mohshadhar@gmail.com
Scientific Committee Approval Date	11/06/2023		Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To enhance the knowledge of students in physical properties of building services systems. 2. To choose appropriate design method of different systems. 3. To analyze the building services mathematically. 4. To get a good experience in building maintenance. 5. To educate the student in dealing with design problems and selecting the proper methods of solutions. 6. To focus on sustainability aspect in design. 7. To use recent aspects of design with considering health and safety factors.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the different systems of building services and knowing the physical principles of each system. 2. Use the appropriate methods of sustainable systems design of building services. 3. Mathematical analysis of services systems. 4. Evaluate the building and select the appropriate methods for maintenance. 5. Describe the plan for installation of building services. 6. Solve engineering problems that related to the building services design. 7. Consider Health and Safety Aspects to the building services design.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: <u>Part A- Introduction to Building Services</u> • Importance of Health and Safety in buildings. • Thermal performance of buildings. [6hrs] <u>Part B- HVAC (heating, ventilation and air conditioning)</u> • Ventilation and air circulations in buildings. • Ductwork systems, jets and plumes, emitters • refrigeration and heat rejection. • Transportation Strategies in buildings. [8hrs] <u>Part C- Electrical Power load Distribution</u> • Estimation of electrical power load. • Types of electrical load distributions and cable selection. • Lighting services. [6hrs] <u>Part D- Principle of Sound waves Transportation in building</u> • Acoustics and Noise Control. • Echo times, sound mitigation, acoustic absorption materials, distribution of speakers in auditorium. [8hrs] <u>Part D- Principals of Fire</u> • Fire Control system • Detection, Suppression, distribution of fire extinguisher in buildings. [8hrs] <u>Part D- Evaluation and maintenance of buildings</u> • methods of building evaluations • determination of maintenance in buildings. [9hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- Teacher-based learning: teacher explain lectures pre-class (lecture notes and videos) and in-class (traditional lecture) - Student-based learning: student will be asked to prepare presentation OR poster and react the interactive among students. - research-based learning: instructor will give students published paper to be discussed in class (open discussion class). - Instructor could give realistic cases or exercises in-class and post-class and ask student to solve these cases in order to enhance the critical thinking skills and improve the ability of students to do calculations. - Invite guest lecturer to update the students with modern steel structure industry. - Site visit to enhance the knowledge of students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	53	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
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	15% (15)	5, 10	LO #1, 2, 3 and 6
	Assignments	2	15% (15)	2, 12	LO # 4, 7
	Report (site visit)	1	10% (10)	13	LO # 5
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	Chapter 1: Introduction to Building Services and importance of Health and Safety in buildings.
Week 2	Chapter 2: thermal performance of buildings: Massive thermal transportation: thermal properties of building members, study the thermal transportation indoor and outdoor of the building (hot gain and hot losses).
Week 3	Thermal conductivity and thermal insulations of buildings. Applications on thermal mitigation Methods
Week 4	Chapter 3: HVAC (heating, ventilation and air conditioning): Ventilation and air circulations in buildings.
Week 5	Ductwork systems, jets and plumes, emitters, pump and fan laws, refrigeration and heat rejection.
Week 6	Chapter 4: Transportation Strategies in buildings: types of transportations such as moving walks, escalators, lifts and their relations to energy consumption.
Week7	<u>Mid-term Exam</u>
Week 8	Chapter 5: Electrical Power load Distribution: estimation of electrical power load, types of electrical load distributions and cable selection, Electrical motor control, alternative currents properties.
Week 9	Lighting services, lighting tensity distribution.
Week 10	Chapter 6: Principle of Sound waves Transportation in building, Acoustics and Noise Control, echo times, sound mitigation.
Week 11	acoustic absorption materials, distribution of speakers in auditorium.
Week 12	Chapter 7: Principals of Fire: Fire Control system, Detection, Suppression.
Week 13	distribution of fire extinguisher in buildings.
Week 14	Chapter 8: Evaluation and maintenance of buildings: methods of building evaluations, determination of maintenance in buildings.
Week 15	determination of maintenance in buildings.
Week 16	Recap and preparation for Final Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	BUILDING SERVICES HANDBOOK. Fourth edition. Copyright © 2007, Roger Greeno and Fred Hall. Published by Elsevier Limited. All rights reserved	No
Recommended Texts	Advances in Building Services Engineering. Studies, Researches and Applications. Loan Sarbu.	No
Websites	Available websites related to the subject.	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Sanitary Engineering I		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UICE504			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	3	Semester of Delivery		5
Administering Department	-	College	-	
Module Leader	Dr.ahmad benwan hassan		e-mail	Ahmadbenwan99@gmail.com
Module Leader's Acad. Title	lecturer		Module Leader's Qualification	Ph.D.
Module Tutor	-		e-mail	-
Peer Reviewer Name	Salam J. Bash AlMaliki		e-mail	salambash2000@yahoo.com
Scientific Committee Approval Date	11/06/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Hydraulics and Hydrology	Semester	4
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Understand the principal concepts of Sanitary Engineering and water treatment. 2. Assess water quantities required for municipal, commercial and industrial uses and water consumption rates. 3. Discriminate water impurities and treatment methods depending on these impurities. 4. Design of water distribution systems with different network apparatus. 5. Apply water treatment steps and techniques. 6. Appraise population growth rate. 7. Estimate water consumption per capita and for firefighting. 8. Outline water pumps and types and suitability of use. 9. Classify water sources for domestic uses.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Assess water properties, quality and quantity for different demands. 2. Evaluate the population and their water consumption 3. Design the required amount of water for firefighting. 4. Classify and identify the types of pipes, connections and valves used in water distribution systems. 5. Analyze and design pipe networks. 6. Design the required power for water pumps. 7. Interpret and apply the principles of sedimentation, coagulation & flocculation, filtration, disinfection and dissolved solid removal (hardness removal). 8. Plan and prepare of water treatment plants design with its different units. 9. Demonstrate an awareness of importance of water treatment of environmental health 10. Carry out different tests on water quality tests.
Indicative Contents المحتويات الإرشادية	1. Forecasting population and fire Demand and calculating the rate of water consumption. 2. Quality of water Supplies and collection of water and studying physical, chemical, and biological characteristics of water. 3. Water distribution system types and layouts with the different pipes materials and pipe network apparatus. 4. Analysis and design of water network. 5. Finding the proper pumps type and power to supply the water network. 6. Water treatment to produce and maintain water that is hygienically safe, aesthetically attractive and palatable through water treatment plant units (intakes, screening, sedimentation, filtration, aeration, disinfection, coagulation, softening, etc.)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures. 2. Tutorials. 3. Assignments and Homework. 4. Lab. Experiments. 5. Exams and Tests. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. In-Class learning videos and photos to discuss.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	77	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	48	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 7 and 8
	Assignments	2	10% (10)	4, 13	LO #, 3 and 9
	Projects / Lab.	1	10% (10)	Continuous	10
	Report	1	10% (10)	13	LO # 5, and 6
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-5
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction, water consumption,
Week 2	Forecasting population, fire demand
Week 3	Water quality supplies, studying physical, chemical, and biological characteristics of water.
Week 4	Water distribution systems layouts and components
Week 5	Pipes, valves, flow in pipes analysis and design
Week 6	Water pumps
Week 7	Mid-term Exam + introduction to water treatment plant design
Week 8	Intake design, screen design
Week 9	Sedimentation theory and sedimentation tank design
Week 10	Rapid mixing tank design, jar test,
Week 11	Coagulation process
Week 12	Flocculation, flocculation tank design
Week 13	Disinfection process, type of disinfectants
Week 14	Water softening, ion exchange,
Week 15	Reverse osmosis, membrane filtration

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1	introduction to lab instruments and glassware
Week 2	physical characteristics of water
Week 3	Color test
Week 4	pH testing
Week 5	Acidity testing
Week 6	Alkalinity test
Week 7	Electrical Conductivity tests

Week 8	Turbidity test
Week 9	Determination of Dissolved and suspended solids and Total solids test.
Week 10	Jar test
Week 11	Water Hardness test
Week 12	Determination of carbonate in water samples
Week 13	Determination of aluminum in water samples
Week 14	Sulphate, nitrate and phosphate tests
Week 15	Chloride tests

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Water Supply and Sewerage, 5 th edition by E.W. Steel and T.J. McGhee	Yes
Recommended Texts	Water Supply Engineering by P.N. Modi	yes
Websites		

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Reinforced Concrete Design I		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	UICE505		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	3	Semester of Delivery	5
Administering Department	-	College	Type College Code
Module Leader	Mohanad Hatem Shadhar	e-mail	mohshadhar@gmail.com
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	-	e-mail	-
Peer Reviewer Name	Wael Raad Saadallah	e-mail	ogaidiwaal@gmail.com
Scientific Committee Approval Date	05/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mechanic of materials I&II	Semester	3,4
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To introduce advanced principles/ concept for design and analysis of reinforced concrete structures and their constructability. 2. To understand material properties and behavior of reinforced concrete. 3. To understand the design philosophies of reinforced concrete structures. 4. To design serviceable and strength structural members. 5. To enhance the student of the health and safety aspects associate with the design and construction of reinforced concrete structures.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Generalized the basic material properties of reinforcement and concrete and their role in the behavior of concrete structures. 2. Apply design method, codes, specification and standard that govern the structural design of reinforced concrete members. 3. Compute the design gravity loads including dead and live loads acting on reinforced concrete structures. 4. Apply the concept of limit states design in design procedure of reinforced concrete members. 5. Design singly reinforced concrete beams to tension only 6. Describe the theoretical concepts that from the basis of design beams, slabs. 7. Design beam or slab depth for the purpose of deflection control. 8. Design T-beam sections which behave as a rectangular section and one-way slabs. 9. Identify the requirement for compression reinforcement in beams (double reinforce sections). 10. Satisfy the strength and serviceability.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A: Introduction to Reinforced Concrete Structures</u> • Structural elements and structural forms, loads, design codes and specifications. • Design criteria, design Philosophy, strength versus Working-Stress, fundamental assumptions for reinforced concrete behavior. [10 hrs] <u>Part B: Design of Reinforced Concrete Beams</u> • Flexure design of a rectangular beam with tension reinforcement only. • Analysis of a rectangular beam with tension and compression reinforcements (a Doubly Reinforced Beam). • Design of a Doubly Reinforced Rectangular Section., Flexure Analysis of a Section with T Shape. Design of a Beam with T-Shape. [24 hrs] <u>Part C - Serviceability</u> • Cracking in flexural members code provisions for crack control. • Control of deflections, immediate deflection, deflections due to Long-term short-term Loads. [16 hrs] <u>Part D - Design of Reinforced Concrete Slabs</u> • Design of One-Way slabs. • Analysis of One-Way Slab System Design. [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The concepts, principles and theories related to reinforced concrete design are given in interactive lectures with worked examples. In terms of directed study, students are encouraged to study the lecture note and solve the tutorial sheet given and the end of each topic and submitted the tutorial sheet for formative feedback. The module is assessed through periodically quizzes, tutorial sheet, assignments and 2 exams which take place at the end of semester (Mid and final exams).

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	62	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	88	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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)	3,9,13	LO #1, 2, 3 ,5 and 8
	Assignments	2	15% (15)	5, 12	LO # 6 and 7
	Report	1	10% (10)	8	LO # 9 and 10
Summative assessment	Midterm Exam	2 hrs	10% (10)	10	LO # 1-5
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Module details presentation + Recap of Pre-requisite modules
Week 2	Structural Elements and Structural Forms, Loads, Design Codes and Specifications
Week 3	Design Criteria, Design Philosophy, Strength Versus Working-Stress Design Methods
Week 4	Fundamental Assumptions for Reinforced Concrete Behavior
Week 5	Flexure Design of a Rectangular Beam with Tension Reinforcement Only
Week 6	Analysis of a Rectangular Beam with Tension and Compression Reinforcements
Week 7	continue
Week 8	Design of a Doubly Reinforced Rectangular Section
Week 9	continue
Week 10	Control of Deflections, Immediate Deflection, Deflections Due to Long-term short-term Loads
Week 11	continue
Week 12	Design of One-Way slabs
Week 13	Design of One-Way slabs with T-beam
Week 14	Analysis of One-Way Slab System
Week 15	Analysis of One-Way Slab with T-beam
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. A. H. Nilson, D. Darwin, and C. W. Dolan, Design of Concrete Structures, 13th Edition, McGraw Hill, 2004. 2. D. Darwin, C. W. Dolan, and A. H. Nilson, Design of Concrete Structures, 15th Edition, McGraw Hill, 2015 (Metric Edition). 3. Building Code Requirements for Structural Concrete (ACI318M-14).	Yes
Recommended Texts	1. James K. Wight, James G. Macgregor. Reinforced concrete, Mechanics and Design. Sixth Edition, Pearson Prentice Hall, USA. 2. Design of Reinforced Concrete by J.C. McCormac and R.H. Brown, Eighth Edition, John Wiley & Sons.	No
Websites	https://www.worldofconcrete.com/en/attendee.html	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Sanitary Engineering and Plumbing Design II		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UICE600			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	3	Semester of Delivery		6
Administering Department		College	-	
Module Leader	Dr.ahmad benwan hassan		e-mail	Ahmadbenwan99@gmail.com
Module Leader's Acad. Title	lecturer		Module Leader's Qualification	Ph.D.
Module Tutor	-		e-mail	-
Peer Reviewer Name	Mahmood Mohammed Hamzah		e-mail	mmhsh1988@gmail.com
Scientific Committee Approval Date	11/06/2023		Version Number	1.0

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	Sanitary Engineering I		Semester	5
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Identify concepts of wastewater and Plumbing Engineering. 2. Demonstrate an awareness of importance of waste water treatment to environmental health nationally and internationally. 3. Provide an insight into sewage pollution control design and strategies
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	4. Calculate de-oxygenation rates, the bio-chemical oxygen demand (BOD) and dissolved oxygen in natural streams. 5. Evaluate the dry weather flow and the storm water quantity 6. Analyze and design of wastewater pipe networks, pumps and firefighting pipe networks. 7. Design the wastewater treatment plant with its different units. 8. Explain sludge treatment and develop disposal techniques. 9. Carry out different tests on water quality tests.
Indicative Contents المحتويات الإرشادية	1. Introduction to wastewater and its characteristics 10. Wastewater quantities for dry weather flow and storm water quantities. 11. Sewer system components and design. 12. Sewers are designed to carry the maximum quantity of sanitary sewage likely to be produced from the contributing area to the particular sewer. 13. Self-purification of Natural Streams: As human and industrial activity has increased, so has the amount of pollutants discharged into the water bodies. Various types of industrial chemicals, fertilizers, and pesticides end up in water. 14. Wastewater Treatment: Characteristics of a municipal wastewater, the degree of treatment required. 15. Sludge Treatment and Disposal. 16. Plumbing engineering: Design the water supply and waste water collection in buildings. 17. Water based firefighting systems

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures. 2. Tutorials. 3. Homework and Assignments. 4. Lab. Experiments. 5. Tests and Exams. 6. In-Class Questions and Discussions. 7. Connection between Theory and Application. 8. Field Trips. 9. Extracurricular Activities. 10. In- and Out-Class oral conservations.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
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)	4, 9	LO #1, 2 and 3
	Assignments	2	10% (10)	2, 10	LO # 4
	Projects / Lab.	1	10% (10)	Continuous	6
	Report	1	10% (10)	13	LO # 5
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-5
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to wastewater and its characteristics
Week 2	Biochemical oxygen demand
Week 3	Dry weather flow, storm water quantity
Week 4	Sewer system components
Week 5	Hydraulic design of sewers
Week 6	Self-purification of Natural Streams
Week 7	Mid-term Exam
Week 8	Design of wastewater treatment plant units
Week 9	Sludge Treatment and Disposal

Week 10	Introduction for plumbing engineering
Week 11	Cold water system in buildings
Week 12	Hot water system in buildings
Week 13	Wastewater collection in buildings
Week 14	Introduction to water-based fire protection systems
Week 15	Design of water-based fire protection systems in buildings
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Dissolved oxygen test
Week 2	Biochemical Oxygen Demand (BOD) test
Week 3	Chemical Oxygen Demand COD test
Week 4	Residual chlorine test
Week 5	Nitrate into water test
Week 6	Phosphate tin water est

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Water Supply and Sewerage, 5 th edition by E.W. Steel and T.J. McGhee	Yes
Recommended Texts	Wastewater Engineering Treatment and Resource Recovery, Metcalf & Eddy	No
Websites		

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Reinforced Concrete Design II		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	UICE601		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	3	Semester of Delivery	6
Administering Department	-	College	Type College Code
Module Leader	Mohanad Hatem Shadhar	e-mail	mohshadhar@gmail.com
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	-	e-mail	-
Peer Reviewer Name	Wael Raad Saadallah	e-mail	ogaidiwaal@gmail.com
Scientific Committee Approval Date	11/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Reinforced Concrete Design I	Semester	5
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Develop conceptual design of reinforced concrete buildings. 2. Enhance student understanding of the health and safety aspects associated with the design and construction of reinforced concrete structures. 3. Provide students with the ability to use the methods of analysis and design of reinforced concrete building elements in accordance with ACI 318-14. 4. Provide an understanding of the overall stability requirements of reinforced concrete buildings in accordance with ACI 318-14. 5. Provide an understanding of the serviceability requirements of Concrete buildings to improve durability and sustainability aspects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Apply design method, codes, specification and standard that govern the structural design of reinforced concrete members. 2. Identify the necessity of deflection and crack control in satisfying serviceability requirements of RC Structures. 3. Design RC two-way slab systems using Direct Design Method. 4. Design and detail of main structural members in concrete buildings. 5. Apply Health and Safety legislation to the design of concrete structures. 6. To design serviceable and strong beams and columns. 7. Design a simply supported beam for flexure and shear 8. Design continuous beams for flexure and shear. 9. Design beams for shear and torsion. 10. Satisfy the strength and serviceability.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A: Design of reinforced concrete beam</u> • Design and analysis of Continuous Beams [6 hrs] <u>Part B: Shear and Diagonal Tension in Beams</u> • Basic Concepts. • Computing of Applied Factored Shear Force V_u. • Shear Strength Provided by Concrete V_c. • Shear Strength Provided by Shear Reinforcement V_s. • Shear Design Based on the More Detailed Relation for V_c. • Shear Design with Effects of Axial Loads. [22 hrs] <u>Part C: Analysis and Design for Torsion</u> • Basic Concepts. • ACI Provisions for Torsion Classification and Computing of T_u. • ACI Provisions for ϕT_n. • Design of beams for shear + torsion; Bar development length. [8 hrs] <u>Part D: Design of Reinforced Concrete Columns</u> • ACI Analysis Procedure for a Short Column under an Axial Load (Small Eccentricity). • Analysis of a Column with Compression Load Plus Uniaxial Moment. [16 hrs]

	Part E: Design of Edge Supported Two-Way Slabs Design of an Edge Supported Two-way Solid Slab Including Analysis and Design of Supporting Continuous Beams. [8 hrs]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The concepts, principles and theories related to reinforced concrete design are given in interactive lectures with worked examples. In terms of directed study, students are encouraged to study the lecture note and solve the tutorial sheet given and the end of each topic and submitted the tutorial sheet for formative feedback. The module is assessed through periodically quizzes, tutorial sheet, assignments and 2 exams which take place at the end of semester (Mid and final exams).

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	62	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	88	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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)	3,9,13	LO #1, 2, 3, 5 and 9
	Assignments	2	15% (15)	5, 12	LO # 6 and 7
	Report	1	10% (10)	8	LO # 9 and 10
Summative assessment	Midterm Exam	2 hrs	10% (10)	10	LO # 1-7
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Module details presentation + Recap of Pre-requisite modules
Week 2	Design of reinforced concrete beam; Design and analysis of Continuous Beams
Week 3	Continue
Week 4	Shear and Diagonal Tension in Beams; Basic Concepts, Shear Strength Provided by Concrete V_c , Shear Strength Provided by Shear Reinforcement V_s , Computing of Applied Factored Shear Force V_u
Week 5	Continue
Week 6	Shear Design Based on the More Detailed Relation for V_c , Shear Design with Effects of Axial Loads
Week 7	Analysis and Design reinforced concrete beams for Torsion, ACI Provisions for Torsion Computing of T_u , Provisions for ϕT_n , Design of beams for shear + torsion; Bar development length
Week 8	Continue
Week 9	Design of Reinforced Concrete Columns; ACI Analysis Procedure for a Short Column under an Axial Load (Small Eccentricity).
Week 10	Continue
Week 11	Analysis of a Column with Compression Load Plus Uniaxial Moment
Week 12	Design of Edge Supported Two-Way Slabs
Week 13	Continue
Week 14	Design of an Edge Supported Two-way Solid Slab Including Analysis and Design of Supporting Continuous Beams
Week 15	continue
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. A. H. Nilson, D. Darwin, and C. W. Dolan, Design of Concrete Structures, 13th Edition, McGraw Hill, 2004. 2. D. Darwin, C. W. Dolan, and A. H. Nilson, Design of Concrete Structures, 15th Edition, McGraw Hill, 2015 (Metric Edition). 3. Building Code Requirements for Structural Concrete (ACI318M-14).	Yes
Recommended Texts	4. James K. Wight, James G. Macgregor. Reinforced concrete, Mechanics and Design. Sixth Edition, Pearson Prentice Hall, USA. 5. Design of Reinforced Concrete by J.C. McCormac and R.H. Brown, Eighth Edition, John Wiley & Sons.	No
Websites	https://www.worldofconcrete.com/en/attendee.html	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Structures Analysis II		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	UICE604		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	6
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Lec.Yasir Wisam Abduljaleel	e-mail	yasiraliris@gmail.com
Module Leader's Acad. Title	lecture	Module Leader's Qualification	Master
Module Tutor	-	e-mail	-
Peer Reviewer Name	Dr.Mohanad Hatem	e-mail	mohshadhar@gmail.com
Scientific Committee Approval Date	11/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Structural analysis I	Semester	5
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This course aimed to apply advanced methods of structural analysis and explore the fundamental theory and concepts used for the analysis of complex structural systems. Also, to apply a comprehensive knowledge of the theoretical framework underpinning linear-elastic analysis of various types of structures (e.g., statically indeterminate trusses, beams and frames) encountered in civil engineering design work. Furthermore, the principles of plasticity and non-linear analysis. The skills and knowledge gained in this course are essential for the design of structures.
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Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Apply principles of structural analysis for linear-elastic and non-linear analysis. 2. Analyses complex structures using appropriate techniques. 3. Apply qualitative analysis skills to estimate the behavior of structures. 4. Analyses complex structures using structural analysis software. 5. Critically analyses and correctly interpret results obtained from structural analysis software. 6. Critically review and present results with respect to design, sustainability and community expectations.
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Indicative Contents المحتويات الإرشادية	Indicative Content Includes the Following. <u>Part A- Work-Energy Methods for Computing Deflections</u> • Introduction. • Strain Energy. • Deflections By the Work-Energy Method (Real Work). • Virtual Work: Trusses. • Virtual Work: Beams and Frames.[15hrs] <u>Part B- Analysis of Indeterminate Structures by The Flexibility Method</u> • Introduction. • Concept Of a Redundant. • Fundamentals of the Flexibility. • Analysis Using Internal Releases. • Support Settlements, Temperature change, And Fabrication Errors. [20hrs] <u>Part C- Introduction to the General Stiffness Method</u> • Introduction. • Comparison Between Flexibility and Stiffness Methods. • Analysis of an Indeterminate Structure By General Stiffness Method. [15hrs] <u>Part D-Nonlinear analysis</u> • Requirements for linear-elastic analysis. • Principle of superposition. • Qualitative analysis. • Displacement (stiffness) method. • Introduction to plasticity theory and non-linear analysis. [20hrs]
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Lectures: Core concepts and theories are presented to students during lectures, often supplemented with slides, diagrams, and videos for better understanding. Tutorials/Workshops: Tutorials or workshops provide opportunities for students to apply lecture material to solve problems, analyze case studies, and interact with instructors or tutors for additional guidance and clarification. Problem-Based Learning: Assignments or projects may be given to students, often based on real-world scenarios, to apply their knowledge and develop critical thinking and problem-solving skills. Group Projects: Collaboration on group projects encourages teamwork and communication skills. It can also provide a platform for peer-to-peer learning. Self-Directed Learning: Students are encouraged to review lecture materials, read recommended textbooks and resources, and practice problem solving in their own time. This enhances their understanding and retention of the course material. Online Learning Platforms: The use of online learning management systems, such as Moodle or Blackboard, can provide additional learning resources, enable online discussions, and allow students to access lecture materials and assignments at their own pace. Guest Lectures/Seminars: Professionals from the industry or academia may be invited to give talks on specific topics, sharing their expertise and practical experiences. Formative Assessment and Feedback: Regular quizzes or tests can be used to assess student understanding and provide feedback. This helps students identify areas they need to focus on and helps instructors adjust teaching strategies as necessary. Field Trips: Visits to construction sites or structural engineering firms can provide a practical perspective on how structural analysis principles are applied in the real world. These learning and teaching strategies aim to promote active engagement, apply theoretical concepts in a practical context, and develop the skills necessary for future professional practice in Civil Engineering.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب له ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	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	10% (10)	5, 10	LO #1, 2, and 7
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 7
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	<u>Work-Energy Methods for Computing Deflections; Introduction</u> , Strain Energy, Deflections By the Work-Energy Method (Real Work)
Week 2	Virtual Work: Trusses
Week 3	Virtual Work: Beams and Frames
Week 4	Analysis of Indeterminate Structures by The Flexibility Method; Introduction, concept Of a Redundant, Fundamentals of the Flexibility
Week 5	Analysis Using Internal Releases
Week 6	Support Settlements, Temperature change, And Fabrication Errors
Week 7	Continued
Week 8	Introduction to the General Stiffness Method; Introduction, Comparison Between Flexibility and Stiffness Methods
Week 9	Continued
Week 10	Analysis of an Indeterminate Structure by General Stiffness Method
Week 11	Part D-Nonlinear analysis; Introduction to plasticity theory and non-linear analysis
Week 12	Requirements for linear-elastic analysis, principle of superposition
Week 13	Continued
Week 14	Qualitative analysis
Week 15	Displacement (stiffness) method
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Fundamentals of Structural Analysis (Fifth Edition) by Kenneth M. Leet et al. 2018	No
Recommended Texts	2. structural analysis (Eighth Edition) by R.C. Hibbeler 2012	No
Websites	https://www.udemy.com/course/structural-analysis-i/	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Soil Mechanics II		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UICE602			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	3	Semester of Delivery		6
Administering Department	-	College	-	
Module Leader	Reem Siham Tawfeeq		e-mail	engreemsiham86@gmail.com
Module Leader's Acad. Title	Asst. Lect.		Module Leader's Qualification	MSc
Module Tutor	-		e-mail	-
Peer Reviewer Name	Dr. Bilal Muassar		e-mail	bilal.muassar@aliraqia.edu.iq
Scientific Committee Approval Date	11/06/2023		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Soil Mechanics I	Semester	5
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Identify the shear forces and stresses that the soil is exposed to as a result of the loads placed on it 2. Distinguish the types of soil through knowledge of the characteristics of compressive and bulging soils 3. Calculating the displacement of the soil under the foundations due to the stresses that the soil is exposed to under the influence of direct loads or as a result of water leakage through the soil 4. Know the effect of water on the behavior of soil and foundations 5. Identify the properties of flexible and plastic soil 6. Know the adhesion properties of soil 7. Knowing how to test soil adhesion in the lab and its suitability for engineering construction work 8. Study and calculate the safety coefficient of the soil under the influence of various stresses
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Avoiding soil failure or collapse by knowing the behavior of the soil under the influence of the stresses resulting from the loads placed on it. 2. Knowing the effect of water leakage through the soil layers, on the foundations, by studying the expansive properties of the soil 3. Controlling the settlement of the foundations by calculating the settlement of the soil under different loads or as a result of water leakage through the soil layers 4. Controlling water leakage through the soil and the resulting problems by calculating the soil safety coefficient 5. Prevent soil failure or collapse resulting from the plasticity and elasticity properties of the soil by studying the behavior and characteristics of the elastic and plastic soils. 6. Controlling soil adhesion problems by calculating soil adhesion by mathematical equations 7. Achieving the economics of engineering design 8. Familiarity with the effects of environmental surroundings on the engineering properties of soil.
Indicative Contents المحتويات الإرشادية	• Shear strength. [15 hrs] • Mohr Coulomb criterion. [15 hrs] • Mohr's circle of stress. [15 hrs] • Shear strength of sands and clays. [15 hrs] • Pore pressure coefficients. [15 hrs] • Stresses, displacements for elastic Theory. [15 hrs] • Consolidation settlement. [15 hrs] • One-dimensional consolidation. [15 hrs] • Determination of coefficient of consolidation. [15 hrs]

	Vertical sand drains. [15 hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in presenting this unit is to provide interactive lectures and conduct laboratory experiments on soil samples brought from real work sites. As well as conducting field visits to engineering work sites and linking them with the information that the student receives in the semester.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	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	15% (10)	4, 8	LO #1, 2, 3 and 6
	Projects / Lab.	2	15% (10)	Continuous	All
	Report	1	10% (10)	12	LO # 3, 6 and 8
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري	
	Material Covered

Week 1	Shear strength
Week 2	Mohr Coulomb criterion
Week 3	Mohr's circle of stress
Week 4	Shear strength of sands and clays
Week 5	Pore pressure coefficients
Week 6	Stresses
Week 7	Displacements for elastic Theory
Week 8	Mid-term Exam
Week 9	Consolidation
Week 10	Consolidation settlement
Week 11	One-dimensional consolidation
Week 12	Determination of coefficient of consolidation
Week 13	Coefficient of consolidation; Num. solution vertical sand drains
Week 14	Num. solution
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Direct shear test
Week 2	Lab 2: Unconfined compression test
Week 3	Lab 3: consolidation drained test
Week 4	Lab 4: UnConsolidation undrained test
Week 5	Lab 5: Standard proctor test
Week 6	Lab 6: Van shear test
Week 7	Lab 7: Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Principles of Geotechnical Engineering Eighth Edition, SI BRAJA M. DAS , KHALED SOBHAN.	Yes
Recommended Texts	2. Soil mechanics by Lambe , T. William; Whitman. 3. Kaniraj S. R, "Design Aids in Soil Mechanics and Foundation Engineering", Tata McGraw Hill. 4. B. M. Das, " Principles of Foundation Engineering" Eighth Edition	Yes
Websites	https://csmrs.gov.in/content/18_1_SoilMechanics.aspx	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Traffic Engineering		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	UICE603		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	6
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Mohammed Hadi Nahi	e-mail	mohammed.h.nahi@aliraqia.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	-	e-mail	-
Peer Reviewer Name	L. Ishraq Hameed Naser	e-mail	ishraq.hameed@aliraqia.edu.iq
Scientific Committee Approval Date	11/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To enable students to formulate the fundamental principles of traffic engineering element , traffic characteristic measurements and their interpretation for infrastructure changes or development. 2. To enable students to understand the design of traffic signal timing with a number of worked examples along with urban traffic control. 3. To evaluate the road safety and driver behaviour and its importance in accident prevention.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the design of traffic signal timing programs for junctions. 2. Perform the traffic studies necessary before making changes to or designing new road infrastructure 3. Exposing them to interdisciplinary approaches in solving engineering problems 4. Assess and conceptualize driver behavior when developing engineering solutions to improve road safety 5. Understand the Fundamental principles of traffic flow:
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: 1. <u>Traffic engineering element:</u> Traffic Volume studies; Travel time studies; Parking studies Vehicles characteristic.[12hrs] 2. <u>Traffic flow :</u> Methods for measuring traffic flow, spot speed studies categories of traffic flow, analysis of speed, flow and density relation [12hrs] 3. <u>Traffic intersection and Signal Timing Calculations:</u> Saturation flow, optimum cycle time, effective green period and dealing with right turning traffic. [12hrs] 4. <u>Driver Behavior and Safety:</u> Psychology of drivers, how drivers react in different situations, how to use knowledge of driver behavior in designing engineering solutions. [12hrs] 5. <u>Fundamental principles of traffic flow:</u> headway, spacing, occupancy, clearance and gab . [12hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- Teacher-based learning: teacher explain lectures pre-class (lecture notes and videos) and in-class (traditional lecture) - Student-based learning: student will be asked to prepare presentation OR poster and react the interactive among students. - Instructor could give realistic cases or exercises in-class and post-class and ask student to solve these cases in order to enhance the critical thinking skills and improve the ability of students to do calculations. - Invite guest lecturer to update the students with modern traffic control strategies.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	62	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	63	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4
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, 2 and 3
	Assignments	2	10% (10)	2, 12	LO # 4
	Report (site visit)	1	5% (5)	13	LO # 5
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1, 2, 3, 5 and 6
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري	
	Material Covered
Week 1	Traffic Volume studies
Week 2	Travel time studies
Week 3	<u>Continued</u>
Week 4	Parking studies
Week 5	<u>Continued</u>
Week 6	Vehicles characteristic
Week 7	Spot speed
Week 8	<u>Continued</u>
Week 9	categories of traffic flow
Week 10	analysis of speed, flow and density relation
Week 11	Traffic intersection
Week 12	Traffic Signal Timing Calculations: Saturation flow, optimum cycle time, effective green period and dealing with right turning traffic.
Week 13	<u>Continued</u>
Week 14	Driver Behavior and Safety
Week 15	Fundamental principles of traffic flow: headway, spacing, occupancy, clearance and gab

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Nicholas J. Garber - Traffic and Highway Engineering: 3rd (third) Edition 2. Highway Engineering, M. Rogers, Blackwell Publishing. 3. Highway Engineering, CA O'Flaherty, Edward Arnold. 4. Highway Traffic Analysis and Design, RJ Salter and NB Hounsell, Macmillan	No
Recommended Texts	1. Principles of Highway Engineering and Traffic Analysis, FL Mannering and WP Kilareski, Wiley	No
Websites	http://www.dot.state.mn.us/trafficeng/	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Computer Applications in Civil Engineering		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	UICE605			
ECTS Credits	3			
SWL (hr/sem)	75			
Module Level	3	Semester of Delivery		6
Administering Department	-	College	Type College Code	
Module Leader	Mohanad Hatem Shadhar		e-mail	mohshadhar@gmail.com
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	Ph.D.
Module Tutor	-		e-mail	-
Peer Reviewer Name	Wael Raad Saadallah		e-mail	ogaidiwaal@gmail.com
Scientific Committee Approval Date	11/06/2023	Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Describe the fundamental tools, knowledge, and skills required to model, evaluate, and design structures. 2. A fundamental knowledge of protections against disproportionate collapse and how structures respond to unexpected loading conditions. 3. Offer a strong basis in design and analysis using the proper software. 4. To advertise the use of computer programming and technical skills in the solving of civil engineering-related problems. 5. To provide students who are inclined toward structural engineering a solid foundation in reinforced concrete.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Specify appropriate materials, components, and systems for the design and construction of single-story and multi-story steel and composite structures. 2. Create models to analyze the responses of steel and composite structures to lateral and gravitational loading. 3. Construct a single or multiple-story steel building with distinct components and connections to codes using design criteria as a reference. 4. Examine sustainability, constructability, and health and safety concerns as they relate to the design and construction of steel and composite structures. 5. 3D spatial consciousness. 6. Graphical data presentation. 7. Interpret the linear and nonlinear response phases of the materials used to construct RC structures and use the appropriate material models for research on the immediate and long-term responses of RC members. 8. Examine and create continuous, combined, and spread footings.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A- Introduction</u> • Overview of ETABS software. • Menus and toolbars. [4hrs] <u>Part B- Modelling</u> • Grid system. • Geometrical modeling. • Materials properties. • Materials definitions. • Type of elements. • Sections. • Defining seismic loads. • Creating plate elements. [10hrs] <u>Part C- Analyses and Design of created models.</u> • Analyses model of reinforced concrete structure. • Analyses model of steel structure. • Analyses truss structure. • Design of strip footing. • Design of raft foundation. [33hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The concepts, principles and theories related to reinforced concrete design are given in interactive lectures with worked examples. In terms of directed study, students are encouraged to study the lecture note and solve the tutorial sheet given and the end of each topic and submitted the tutorial sheet for formative feedback. The module is assessed through periodically quizzes, tutorial sheet, assignments and 2 exams which take place at the end of semester (Mid and final exams).

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	26	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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	2	10% (10)	6,10	LO #1 and 3
	Assignments	2	10% (10)	9, 13	LO # 2 and 6
	Report	2	10% (10)	8	LO # 3 and 8
	Projects / Lab.	1	10% (10)	Continuous	All
Summative assessment	Midterm Exam	2hrs	10% (10)	10	LO # 1-5
	Final Exam	3hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	Material Covered
Week 1	Module details presentation
Week 2	Introduction; An overview of ETABS software, Menus and toolbars
Week 3	Modelling: Grid system, Geometrical modeling, Materials properties.
Week 4	Type of elements, Sections, defining seismic loads, Creating plate elements.
Week 5	Continued
Week 6	Analyses and Design of created models; Analyses model of reinforced concrete structure.
Week 7	continued
Week 8	Analyses model of steel structure
Week 9	Continued
Week 10	Analyses truss structure
Week 11	Continued
Week 12	Design of strip footing
Week 13	Continued
Week 14	Design of raft foundation
Week 15	Continued
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. ETABS, C. (2016). v16 User's Guide Manual. <i>Computers & Structures: Berkeley, CA, USA</i> .	Yes
Recommended Texts	2. National Information Service for Earthquake Engineering (US), & Berkeley. Earthquake Engineering Research Center. (1991). <i>Computer Software for Earthquake Engineering</i> . NISEE/Computer Applications, Earthquake Engineering Research Center, University of California.	No
Websites	https://www.csiamerica.com/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
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