Iraq University College

كلية العراق الجامعة

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

بكالوريوس - هندسة مدنية

Republic of Iraq - Ministry of Higher Education and Scientific Research

Iraq University College

Bachelor's degree in Civil Engineering (First cycle)

Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr

Program Curriculum (2023 - 2024)

جمهورية العراق - وزارة التعليم العالي والبحث العلمي

كلية العراق الجامعة

بكالوريوس في الهندسة المدنية (الدورة الأولى)

سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوربية - كل وحدة اوربية = ٢٥ س

المنهاج الدراسي للعام ٢٠٢٣-٢٠٢٤

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)							
IUC-CE-I	One	1	E111	Mathematics	الرياضيات	English	6				2	92	108	200	8.00	B	
		2	CE111	Engineering Drawing	الرسم الهندسي	English			6		2	92	108	200	8.00	C	
		3	CE113	Engineering Geology	الجيولوجيا الهندسية	English	4		2		2	92	108	200	8.00	B	
		4	E113	Engineering Workshop	الورش الهندسية	English			2		2	32	43	75	3.00	S	
		5	E116	Physics	الفيزياء	English	2				2	32	43	75	3.00	B	
		6										0		0	0.00		
						Total	12	0	10	0	10	340	410	750	30.00		
	Two	1	CE112	Engineering Mechanics	الميكانيك الهندسي	English	8				2	122	128	250	10.00	C	
		2	CE114	Building Materials	مواد البناء	English	4		2		2	92	108	200	8.00	C	
		3	U111	English Language	اللغة الانكليزية	English	4				2	62	88	150	6.00	B	
		4	E115	Computer software	برامجيات الحاسوب	English			2		2	32	43	75	3.00	S	
		5	E117	Chemistry	الكيمياء	English	2				2	32	43	75	3.00	B	
		6										0		0	0.00		
						Total	18	0	4	0	10	340	410	750	30.00		
II	Three	1	CE222	Fluid Mechanics	ميكانيك الموائع	English	4		2		2	92	108	200	8.00	C	CE112
		2	CE214	Concrete Technology	تكنولوجيا الخرسانة	English	4		2		2	92	108	200	8.00	C	
		3	E211	Applied Mathematics	الرياضيات التطبيقية	English	6				2	92	108	200	8.00	S	E111
		4	CE215	Computer Programing	برمجة الحاسبات	English	1		2		2	47	53	100	4.00	S	
		5	E214	Human rights and democracy	حقوق الإنسان والديمقراطية	Arabic	2				2	32	18	50	2.00		
		6										0		0	0.00		
						Total	17	0	6	0	10	355	395	750	30.00		

IUC-CE-	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)							
	Four	1	CE212	Strength of Materials	مقاومة المواد	English	6				2	92	108	200	8.00	C	CE112
		2	CE211	Engineering Surveying	المساحة الهندسية	English	4			2	2	92	108	200	8.00	C	CE111
		3	CE221	Building construction and drawing	إنشاء المباني والرسم المدني	English	4			2	2	92	108	200	8.00	C	CE111
		4	CE213	Engineering Statistics	الإحصاء الهندسي	English	3				2	47	53	100	4.00	S	
		5	E215	The crimes of the defunct Ba'ath p	جرائم حزب البعث البائد	Arabic	2				2	32	18	50	2.00	S	
		6										0		0	0.00		
						Total	19	0	0	4	10	355	395	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)							
IUC-CE-III	Five	1	CE312	Theory of Structure	نظرية الانشاءات	English	8				2	122	128	250	10.00	C	CE212
		2	CE316	Soil Mechanics	ميكانيك التربة	English	4		2		2	92	133	225	9.00	C	
		3	CE311	Engineering & Numerical Analysis	التحليلات الهندسية والعددية	English	6				2	92	108	200	8.00	C	E211
		4	CE315	Computer applications	تطبيقات الحاسوب	English			2		2	32	43	75	3.00	S	CE215
		5										0		0	0.00		
		6										0		0	0.00		
						Total	18	0	4	0	8	338	412	750	30.00		

IUC-CE-III	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)							
	Six	1	CE322	Reinforced concrete design	تصاميم الخرسانة المسلحة	English	8				2	122	128	250	10.00	C	CE212
		2	CE317	Drainage and irrigation engineerin	هندسة الري و البزل	English	6				2	92	133	225	9.00	C	
		3	CE319	Traffic Engineering	هندسة المرور والمواصلات	English	4		2		2	92	108	200	8.00	C	
		4	CE318	Project management and enginee	الإدارة الهندسية والاقتصاد	English	2				2	32	43	75	3.00	C	
		5										0		0	0.00		
		6										0		0	0.00		
						Total	20	0	2	0	8	338	412	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)							
IUC-CE-IV	Seven	1	CE422	Design of concrete structure	تصاميم المنشات الخرسانية	English	6				2	92	133	225	9.00	C	CE322
		2	CE416	Foundation Engineering	هندسة الأسس	English	6				2	92	108	200	8.00	C	CE316
		3	CE417	Engineering Hydrology	الهيدرولوجيا الهندسية	English	4				2	62	63	125	5.00	C	
		4	CE418	Method of construction and estima	طرق الإنشاء و التخمين	English	4				2	62	63	125	5.00	C	
		5	CE415	Harbor Engineering	هندسة الموانئ	English	2				2	32	43	75	3.00	C	
						Total	22	0	0	0	10	340	410	750	30.0		
	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)							
	Eight	1	CE412	Steel structure design	تصاميم المنشات الحديدية	English	6				2	92	108	200	8.00	C	CE322
		2	CE422	Sanitary Engineering	الهندسة الصحية	English	6		2		2	122	78	200	8.00	C	CE222
		3	CE419	Highway Engineering	هندسة الطرق والتبليط	English	2		2		2	62	88	150	6.00	C	CE319
		4	CE413	Hydraulic engineering	منشآت هيدروليكية	English	4				2	62	38	100	4.00	C	
		5	CE420	Engineering Project	المشروع الهندسي	English	2				2	32	68	100	4.00	S	
						Total	20	0	4	0	10	370	380	750	30.0		
						Total	146	0	30	4	76	2776	3224	6000	240.0	Must be 240 ECTS	

Note: The student should complete 4 weeks of Summer Internships to fullfil the requirements of the Bachelor's degree

Structured SWL (hr/w) type		
	CL	Class Lecture
	Lab	Laboratory
	Pr	Practical Training
	Tut	Tutorial
	Lect	Online lecture
	Sem	Seminar

Module type		
	B	Basic learning activities
	C	Core learning activity
	S	Suport or related learning activity
	E	Elective learning activity

SWL:	Student Workload
SSWL:	Structured SWL
USSWL:	Unstructured SWL

Note: Columns O, Q and R are progrmaed, protected and should not be edited

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Civil Engineering

بكالوريوس - هندسة مدنية

Table of Contents | جدول المحتويات

1. Mission & Vision Statement

Vision Statement

The Civil Engineering academic staff at Iraq University College believe that students come to understand the discipline of Civil Engineering through a combination of course work, laboratory experiences, research, and fieldwork. The combination of instructional methods leads students to a balanced understanding of the applied methods used by Civil engineers and to create high quality civil engineers with global perspective and to inculcate in them professionalism and work ethics for building a stronger society.

Mission Statement

The Civil Engineering academic staff pursues a multifaceted charge at at Iraq University College. The Program seeks to provide all Civil Engineering students with fundamental knowledge of Engineering, as well as a deeper understanding of a selected focus area within the Civil Engineering sciences. The curriculum and advising have been designed to prepare graduates for their professional future, whether they choose to work as site Engineers specializing in various engineering fields, or to pursue advanced degrees in the Civil Engineering.

2. Program Specification

Programme code:	BSc-Civil	**ECTS**	240
Duration:	4 levels, 8 Semesters	**Method of Attendance:**	Full Time

Civil Engineering is a wonderfully diverse field of study and is well equipped to provide a comprehensive understanding of the built environment. The emphasis of the program is on the entirety of civil engineering, encompassing various aspects ranging from the materials that construct structures to the design and maintenance of infrastructure. The degree is highly sought after - for some, it's the broad scope of the subject that captivates, while others see it as a pathway to specialization.

At Level 1, students are introduced to the fundamental principles of Civil Engineering, laying the foundation for progression into any program within the civil engineering discipline. Core topics specific to each program are covered at Level 2, preparing students for research-driven subject-specific modules at Levels 3 and 4. This ensures that our graduates not only appreciate the integration of research and teaching but also align with the mission statements of the university and the school.

Throughout Levels 2, 3, and 4, students have the freedom to choose more than half of their module credits, provided they select a range of modules that reflect the complexity of civil engineering, from materials to structures, transportation systems, and environmental considerations. This flexibility allows students to cultivate their own wide-ranging interests within the field. Decisions on module selection are made in consultation with personal tutors, who provide valuable guidance.

The research ethos is developed and nurtured from the beginning through practical applications. Practical work is either integrated into lecture modules or taught separately in dedicated practical modules, accompanied by research seminars and tutorials. In Level 1, there is a compulsory field course that students must successfully complete to progress into Level 2, with optional field courses available at Levels 2, 3, and 4. At Level 4, all students undertake an independent research project, which can take the form of a library or data analysis project worth 20 credits, or a field or laboratory-based project worth 8 credits.

Civil Engineering is a captivating field that encompasses a broad spectrum of knowledge and skills. With our comprehensive program and supportive environment, students are equipped to become well-rounded civil engineering professionals, adept at integrating research and teaching to tackle the challenges of the built environment.

3. Program Objectives

the program objectives for Civil Engineering typically encompass the following goals:

1- Technical Proficiency: The program aims to provide students with a strong foundation in core civil engineering principles, theories, and technical skills. This includes knowledge and competency in areas such as structural analysis and design, transportation systems, geotechnical engineering, environmental engineering, and construction management.
2- Problem Solving: Students are trained to apply engineering principles and analytical methods to solve complex civil engineering problems. They learn to identify and define problems, gather relevant information, analyze data, and develop innovative and sustainable solutions. This objective emphasizes critical thinking, creativity, and the ability to work collaboratively in multidisciplinary teams.
3- Design and Innovation: The program encourages students to develop proficiency in engineering design by incorporating safety, sustainability, economic considerations, and ethical principles into their designs. They are exposed to real-world design challenges and learn to use advanced software tools, conduct feasibility studies, and consider social and environmental impacts in their design solutions.
4- Communication Skills: Effective communication is vital in the field of civil engineering. Students are taught to communicate technical concepts and ideas clearly and concisely through written reports, presentations, and visual aids. They also develop interpersonal and teamwork skills to effectively collaborate with clients, colleagues, and stakeholders.
5- Professionalism and Ethics: The program instills a strong sense of professional ethics, responsibility, and integrity in students. They learn about the ethical, societal, and environmental considerations associated with civil engineering practice. The objective is to prepare students to be ethical professionals who prioritize safety, sustainability, and the public interest in their work.
6- Lifelong Learning: Civil engineering is a dynamic field that constantly evolves with technological advancements and changing societal needs. The program aims to foster a passion for lifelong learning and professional development in students. They are encouraged to stay abreast of emerging trends, engage in continuing education, and pursue postgraduate studies to enhance their knowledge and skills throughout their careers.

These program objectives collectively prepare graduates to excel in the diverse and ever-changing field of civil engineering, equipping them with the necessary knowledge, skills, and attributes to tackle complex engineering challenges and contribute to the betterment of society.

4. Student Learning Outcomes

Student Learning Outcomes for a Bachelor of Science in Civil Engineering program can be outlined as follows:

Outcome 1

Technical Competence

Graduates will demonstrate a strong understanding of core civil engineering principles, theories, and practices. They will be able to apply this knowledge to analyze and solve complex engineering problems related to structures, transportation systems, geotechnical engineering, environmental engineering, and construction management.

Outcome 2

Effective Communication

Graduates will effectively communicate engineering concepts, ideas, and solutions through oral presentations, written reports, and visual aids. They will demonstrate proficiency in technical communication, both within the engineering community and with diverse stakeholders.

Outcome 3

Laboratory and Field Skills

Graduates will acquire practical skills in conducting laboratory experiments and field studies relevant to civil engineering. They will be proficient in using scientific equipment, computer technology, and appropriate safety protocols in data collection, analysis, and interpretation.

Outcome 4

Applied Scientific Knowledge

Graduates will demonstrate a comprehensive understanding of how scientific principles and theories apply to real-world civil engineering challenges. They will recognize the historical development of foundational engineering theories and laws, and apply the scientific method to engineering problem-solving.

Outcome 5

Data Analysis and Quantitative Skills

Graduates will possess strong quantitative skills to collect, analyze, and interpret data related to civil engineering projects. They will demonstrate proficiency in using appropriate software tools and statistical techniques for data analysis, modeling, and simulation.

Outcome 6

Critical Thinking and Problem-Solving

Graduates will exhibit critical thinking abilities and problem-solving skills in the context of civil engineering. They will be able to identify and define complex engineering problems, analyze alternative solutions, and develop innovative and sustainable designs. They will consider factors such as safety, economic viability, environmental impact, and social considerations in their decision-making.

Outcome 7

Lifelong Learning and Professional Development

Graduates will recognize the importance of continuous learning and professional development in the field of civil engineering. They will exhibit a commitment to staying updated with advancements in the discipline, engaging in lifelong learning opportunities, and pursuing professional growth through memberships, certifications, and further education.

5. Academic Staff

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6. Credits, Grading and GPA

Credits

Iraq University College 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:

   CGPA = [(1st module score x ECTS) + (2nd module score x ECTS) + ……] / 240

7. Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
E111	Mathematics	92	108	8.00	B	
CE111	Engineering Drawing	92	108	8.00	C	
CE113	Engineering Geology	92	108	8.00	B	
E113	Engineering Workshop	32	43	3.00	S	
E116	Physics	32	43	3.00	B	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CE112	Engineering Mechanics	122	128	10.00	C	
CE114	Building Materials	92	108	8.00	C	
U111	English Language	62	88	6.00	B	
E115	Computer software	32	43	3.00	S	
E117	Chemistry	32	43	3.00	B	

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CE222	Fluid Mechanics	92	108	8.00	C	CE112
CE214	Concrete Technology	92	108	8.00	C	
E211	Applied Mathematics	92	108	8.00	S	E111
CE215	Computer Programing	47	53	4.00	S	
E214	Human rights and democracy	32	18	2.00	S	

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CE212	Strength of Materials	92	108	8.00	C	CE112
CE211	Engineering Surveying	92	108	8.00	C	CE111
CE221	Building construction and drawings	92	108	8.00	C	CE111
CE213	Engineering Statistics	47	53	4.00	S	
E215	The crimes of the defunct Ba'ath party	32	18	2.00	S	

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CE312	Theory of Structure	122	128	10.00	C	CE212
CE316	Soil Mechanics	92	133	9.00	C	
CE311	Engineering & Numerical Analysis	92	108	8.00	C	E211
CE315	Computer applications	32	43	3.00	S	CE215

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CE322	Reinforced concrete design	122	128	10.00	C	CE212
CE317	Drainage and irrigation engineering	92	133	9.00	C	
CE319	Traffic Engineering	92	108	8.00	C	
CE318	Project management and engineering economics	32	43	3.00	C	

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CE422	Design of concrete structure	92	133	9.00	C	CE322
CE416	Foundation Engineering	92	108	8.00	C	CE316
CE417	Engineering Hydrology	62	63	5.00	C	
CE418	Method of construction and estimation	62	63	5.00	C	
CE415	Harbor Engineering	32	43	3.00	C	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CE412	Steel structure design	92	108	8.00	C	
CE422	Sanitary Engineering	122	78	8.00	C	CE222
CE419	Highway Engineering	62	88	6.00	C	CE319
CE413	Hydraulic engineering	62	38	4.00	C	
CE420	Engineering Project	32	68	4.00	S	

8. Contact

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Table of Contents

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 (38) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظره عامه

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج الهندسة المدنية للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (38) مادة دراسية، على سبيل المثال، مع (6000) إجمالي ساعات حمل الطالب و240 إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
E111	Mathematics	8	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	0	92	108

Description

After successful completion of the module, students should be able to:

- Work with functions represented in various ways: graphical, numerical, analytical, or verbal. They should understand the connections among these representations. The functions include linear, polynomial, absolute value, rational, exponential, logarithmic, trigonometric, inverse trigonometric, hyperbolic, inverse hyperbolic, and piecewise defined functions.
- Define and apply the concepts of limits and continuity to the mentioned functions and study them graphically and analytically.
- Understand the meaning of the derivative in terms of a rate of change and local linear approximation, and should be able to use derivatives to solve a variety of problems.
- Understand the meaning of the definite integral both as a limit of Riemann sums as the net accumulation of change and should be able to use integrals to solve a variety of problems.
- Understand the relationship between the derivative and the definite integral as expressed in both parts of the Fundamental Theorem of Calculus.

Use various integration techniques to obtain anti-derivatives without an integral table or calculator.

Module 2

Code	Course/Module Title	ECTS	Semester
CE111	Engineering Drawing	8	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
0	6	92	108

Description

- Get information about the important tools for engineering drawing. This will give student basic knowledge of technical drawings professions and means of communications to others.
- Knowing the types of lines and their applications in technical drawings.
- Learning the steps to construct different geometric figures like lines, arcs, polygon, ellipse etc. which is essential for engineer.
- Comprehend general projection theory, with emphasis on orthographic projection to represent three-dimensional objects in two-dimensional views.
- Develop student's imagination and ability to represent the shape size and specifications of physical objects.
- Learning how to draw sectional views.
- Knowing how to place dimensions on engineering drawings.
- Equipped with the skill that enables the students to convert orthographic projection into isometric projection.

Module 3

Code	Course/Module Title	ECTS	Semester
CE113	Engineering Geology	8	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	2	92	108

Description

Engineering Geology is defined as the discipline of applying geologic data, techniques, and principles to the study both

(a) naturally occurring rock and soil materials, and surface and sub-surface fluids and

(b) The interaction of the introduced materials and processes with the geologic environment, so that geologic factors affecting the planning, design, construction, operation and maintenance of engineering structures (fixed works) and development, protection, and remediation of ground water resources or, adequately recognized, interpreted for use in engineering and related practice

The student will be trained to know the description of soil and rock masses for engineering purposes and is also expected to know the following:

1. Engineering geological maps and its applications.
2. Rock engineering properties and the geotechnical problems they cause.
3. The various techniques for soil and rock improvement.

Module 4

Code	Course/Module Title	ECTS	Semester
E113	**Engineering Workshop**	3	**1**
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
0	2	32	43

Description

The Engineering Workshops consist of the Machine Shop (metal work), the Fitting Shop, the Foundry, the Smithy, the Welding shop, the Carpentry Shop and the Motor Vehicle Repair Unit and Service Facility.

The Engineering Workshops have two main functions. Firstly, its resources and facilities are utilized for academic work and training of engineering undergraduates. Experiments as well as training sessions are conducted for the First, Third and Final Year undergraduates in the areas of Workshop Technology, Production Engineering, Production Technology and Automobile Technology. In addition to these, the manufacture of necessary hardware for student projects is also carried out in the workshops.

The other function includes the manufacture of equipment for teaching and research, maintenance of machines and equipment, industrial training of undergraduates and NAITA (National Apprentice Industrial and Training Authority) trainees, industrial consultancy work (design, manufacturing of machines and mechanisms for industry), evaluation of craftsman and technical personnel, motor vehicle repair (university fleet) and servicing, and a variety of fabrication work for the faculty.

Module 5

Code	Course/Module Title	ECTS	Semester
E116	Physics	3	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	43

Description

The Physics Module in Civil Engineering serves as a fundamental component of the curriculum, providing students with a solid understanding of the physical principles that govern the behavior of materials, structures, and natural phenomena encountered in the field of civil engineering. This module equips students with the essential knowledge required to analyze, design, and construct various civil engineering projects while considering the laws of physics that underpin their functionality and stability.

Key aspects of the Physics Module in Civil Engineering include:

1. **Mechanics and Statics:** This section delves into the study of forces, equilibrium, and the behavior of objects at rest or in motion. Students learn to calculate forces, moments, and stresses on different structures, ensuring that they can design structures that can withstand various load conditions.
2. **Materials and Properties:** Understanding the properties of construction materials is vital. This part of the module covers the physical properties of materials such as concrete, steel, wood, and composites. Students learn about properties like elasticity, thermal expansion, and strength, which influence how materials respond under different conditions.

Module 6

Code	Course/Module Title	ECTS	Semester
CE112	Engineering Mechanics	10	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
8	0	122	128

Description

A program with a general focus on the application of the mathematical and scientific principles of classical mechanics to the analysis and evaluation of the behavior of structures, forces and materials in engineering problems. Includes instruction in statics, kinetics, dynamics, kinematics, celestial mechanics, stress and failure, and electromagnetism.

Topics to be covered include equivalent systems of forces, resultants and distributed forces, equilibrium of rigid bodies, centroids, centers of gravity, fluid statics, moments of inertia, friction and virtual work. Analysis of frames and machines, forces in beams, internal stresses, and stability will also be considered. Vector algebra will be used throughout.

The course begins with an introduction that covers the fundamental concepts and principles of Statics. The equilibrium of particles is then introduced along with the rules of adding and subtracting of force vectors. The course then proceeds to cover the equilibrium of rigid bodies in two and three dimensions and the analysis of different types of structures and machines. Determination of the moment of a force about an arbitrary point and/or axis, the equivalence of a system of forces and/or couples to the Resultant Force and/or Couple will also be introduced. The final part of the course will cover frictional forces and the structural properties of areas.

Module 7

Code	Course/Module Title	ECTS	Semester
CE114	Building Materials	8	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	2	92	108

Description

1- Definition of building materials and the importance of studying them.

2- Studying models of building materials.

3- How to deal with building materials and benefit from them.

4- History of building materials and ways to develop them.

5- Studying all the properties related to building materials, including physical, chemical, mechanical, etc.

6- Knowing the building materials used previously and at the present time.

7- Methods of preparing old and modern building materials.

8- The different properties of building materials.

9- Laws and equations related to each material.

10- Knowing the factors affecting these materials as well as ways to develop them.

Module 8

Code	Course/Module Title	ECTS	Semester
U111	English Language	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	0	62	88

Description

- Improve the students' skills of reading, speaking, and writing. Enrich the vocabulary of the student with new words related to Civil Engineering.
- Clarify the basic concepts of the English language by defining the tools for grammar, formulating sentences, texts, and pronunciation.
- Acquisition of skills in speaking and writing research and reports.
- The ability to read, write and to gain experience in dealing with foreign companies

Module 9

Code	Course/Module Title	ECTS	Semester
E115	Computer software	3	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
0	2	32	43

Description

- To knowledge of the most important components and basics of a computer
- To understand algorithms and flowcharts
- To learn how to use computer software (Word, Excel, and Power point)
- Knowledge of computer basics
- Building an integrated algorithm for any program
- Draw a flowchart for any program.
- Using Word and creating a Word file
- Drawing charts using Excel
- Perform all calculations and obtain results using Excel.
- Preparing a presentation using PowerPoint

Module 10

Code	Course/Module Title	ECTS	Semester
E117	Chemistry	3	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	43

Description

he Chemistry Module in Civil Engineering is a crucial component of the curriculum designed to provide students with a comprehensive understanding of chemical principles and their applications in the realm of civil engineering. This module equips students with the knowledge needed to analyze the chemical properties of construction materials, assess environmental impact, and develop sustainable solutions for various engineering projects.

Key aspects of the Chemistry Module in Civil Engineering include:

1. **Basic Chemistry Concepts:** This section introduces students to foundational concepts such as atomic structure, chemical bonding, and chemical reactions. Understanding these principles is essential for comprehending how materials behave and interact on a molecular level.
2. **Construction Materials:** The module explores the chemical composition and properties of construction materials like concrete, asphalt, metals, polymers, and ceramics. Students learn about how these materials are synthesized, processed, and modified to achieve desired characteristics for different applications.
3. **Material Durability and Degradation:** Students delve into the chemical processes that lead to material degradation, including corrosion of metals, deterioration of concrete due to environmental exposure, and aging of polymers. This knowledge is vital for designing structures that can withstand long-term environmental stress.
4. **Environmental Chemistry:** Environmental impact assessment is a key consideration in civil engineering projects. Students learn about the interactions between construction materials, pollutants, and the environment. This knowledge helps in designing projects that minimize negative environmental effects.

Module 11

Code	Course/Module Title	ECTS	Semester
CE222	Fluid Mechanics	8	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	2	92	108

Description

This module covers a wide range of topics of fluid mechanics in order to offer basic knowledge and foundations applicable to various civil engineering problems. This module introduces fundamental of conservation (mass, momentum and energy) laws of fluid flow, potential (ideal) flow, inviscid compressible flow and viscous flow. This module is also complemented by lab classes and tutorials

The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, and interactive tutorials.

Module 12

Code	Course/Module Title	ECTS	Semester
CE214	Concrete Technology	8	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	2	92	108
Description			
This course covers the information about cement (manufacturing, chemical composition, hydration, properties and, types of cement), aggregate (classification, sampling, properties, bulk of sand, deleterious substances, soundness of aggregate and concrete, sieve analysis, grading curves, max. aggregate size) and concrete (consistency, workability, segregation & bleeding , mixing, compacting , concreting in hot weather, ready mixed concrete, Strength of concrete , types of strength, factors affecting the strength, bond strength between concrete & steel and curing) the American mix design, British mix design, examples, Durability of concrete, Elasticity, shrinkage, creep, Admixture, new type of concrete.			

Module 13

Code	Course/Module Title	ECTS	Semester
E211	Applied Mathematics	8	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	0	92	108

Description

The course aims to;

1- Presenting polar coordinates and their applications in engineering

2- Presenting vectors and their applications in engineering

3- Presenting series and their applications in engineering

4- Presenting partial derivatives and their applications in engineering

5- Presenting multiple integral and their applications in engineering

6- Presenting complex numbers and their applications in engineering

Knowledge and Understanding

1- Understanding polar coordinates and their relation to Cartesian coordinates and their applications.

2- Studying vectors and use them to study the analytic geometry of space with their important applications in engineering.

3- Studying different types of series and their applications in solving different engineering and mathematical problems

4- Using partial differentiation in deriving different surface equations, rate of change, optimization problem and estimation of change.

5- Studying and using multiple integral and their applications in civil engineering such as determining areas, volumes, center of masses and moments of inertia.

6- Studying complex numbers and their relations in solving different mathematical problems.

Module 14

Code	Course/Module Title	ECTS	Semester
CE215	Computer Programing	4	3
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
1	2	47	53

Description

Students are introduced to the use of structured problem-solving methods, algorithms, structured programming, and object-oriented programming. Students use a high-level programming language to learn how to design, develop, and document well-structured programs using software engineering principles. Students learn the workings of a computer as part of programming. In a laboratory setting, through critical thinking and investigation, students will iteratively design and build a variety of applications to reinforce learning and develop real world competency in Computer Programming. This course is for students who plan to take further courses in Computing Science or to learn basic programming concepts.

Module 15

Code	Course/Module Title	ECTS	Semester
E114	Human rights and democracy	2	3
Class (hr/w)		**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	18

Description

This module focuses less on human rights rules and laws than on the assumptions of human rights, the historical context and issues around their operation and implementation. It draws from a new and growing literature on the sociology and anthropology of human rights which seeks to move beyond the assumptions of legal positivism (rights as being `read off¿ from lists of human rights covenants) in order to develop the `legal realist argument which focuses upon the living law of the operation of courts, the police, and the everyday understandings which citizens give to notions such as truth, justice, and morality.

Module 16

Code	Course/Module Title	ECTS	Semester
CE212	Strength of Materials	8	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	0	92	108

Description

The objective of this course is elaborate on the knowledge of engineering mechanics (statics) and to teach the students the purpose of studying strength of materials with respect to civil engineering design and analysis. The course introduces the students to the concepts of engineering mechanics of materials and the behavior of the materials and structures under applied loads

The objectives of, Strength of Materials, are to learn the principles of mechanics applied to different materials and to develop problem solving skills through application of these principles to basic engineering problems. Specific topics covered in this class include: behavior of axially loaded members; torsion of circular shafts; stresses and deflections in beams; connectors in built-up beams; stress transformation under rotation of axes; principal stresses; triaxial stress and maximum shear stress; pressure vessels; and buckling behavior of columns. The course will rely on students' prerequisite knowledge of mathematics and basic science in developing principles and analytical techniques of mechanics of materials.

Module 17

Code	Course/Module Title	ECTS	Semester
CE211	Engineering Surveying	8	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	2	92	108

Description

The aim of this Module is to provide the student with a deep understanding of surveying and construction activities; practical application of topographic surveying skills, an awareness of the preliminary considerations involved in construction developments and a knowledge of the materials and procedures employed in construction of small commercial/industrial building works.

1. Apply the basic surveying concepts, principles, and theories on distance and angular measurements as well as area computation.
2. Solve distances, elevations, and areas from a provided set of survey data.
3. Apply the basic surveying concepts, principles, and theories on determining horizontal and vertical distances using stadia.
4. Compute the missing data from incomplete traverse data.
5. Acquire a working knowledge of the design and layout of horizontal or vertical curves in highways or railways.
6. Determine and use the appropriate methodology in calculating earthworks in various civil engineering constructions.

Module 18

Code	Course/Module Title	ECTS	Semester
CE221	Building construction and drawings	8	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	2	92	108
Description			
This class provides an understanding of construction types from fire resistive materials such as brick, block, concrete and steel, to wood frame structures. These typical single family and multifamily residential or business occupancies may be balloon frame, “stick built” with full dimensional lumber, or engineered components. The structural members of floor and roof systems are discussed as they relate to their intended purpose and what they do under live and dead loads while under the stress of fire and suppression activities. Openings such as windows, doors, skylights and ventilation shafts are discussed as they relate to the firefighting, search and rescue profile.			

Module 19

Code	Course/Module Title	ECTS	Semester
CE213	Engineering Statistics	4	4
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	47	53

Description

The module aims to present the basic of engineering statistics by analyzing, organizing and describing data in tables and drawings, knowing the measures of dispersion and central tendency, in addition to knowing the theory of probability and inference from the data to make decisions and linking them to engineering reality.

A- Knowledge and Understanding

1- Understand the importance of statistics and its divisions.

2- Learn how to show and represent statistical data with tables or graphics.

3- Identify the most important measures of central tendency and dispersion of data.

4- Learn about probability theory and its different distributions.

5- Identifying the design of samples, their estimation, and knowledge of their properties.

B. Subject-specific skills

1- Analyze, organize, and describe data in tables and/or curves.

2- Describe the averages of the data and methods of measuring their dispersion.

3- Engineering inference from the statistical data to take the appropriate decision.

4- Linking information to engineering reality.

Module 20

Code	Course/Module Title	ECTS	Semester
E114	The crimes of the defunct Ba'ath party	2	4
Class (hr/w)		**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	18

Description

"The Crimes of the Defunct Ba'ath Party" module is a focused study that examines the historical, political, and ethical dimensions of the actions and policies carried out by the Ba'ath Party during its time in power. This module delves into the significant impact of the party's rule on societies, individuals, and international relations.

Key components of the module include:

1. Historical Context: The module provides a comprehensive overview of the Ba'ath Party's rise to power, its ideologies, and its governance in various countries, such as Iraq . This historical context sets the stage for analyzing the subsequent actions and their repercussions.
2. Human Rights Violations: One of the central focuses of this module is to explore the reported human rights abuses, including mass killings, torture, and suppression of dissent, attributed to the Ba'ath Party regimes. Students engage in critical discussions about the social, moral, and ethical implications of these actions.
3. Impact on Society: The module delves into the social consequences of the Ba'ath Party's policies, such as the displacement of populations, censorship of media, and the stifling of cultural diversity. Understanding these effects contributes to a broader comprehension of the complexities of governance and power dynamics.
4. International Relations: The Ba'ath Party's role in regional and international politics is examined. This includes its conflicts with neighboring countries, alliances with global powers, and the broader geopolitical ramifications of its actions.
5. Transitional Justice: The module may cover efforts to address the crimes committed by the Ba'ath Party, including trials, truth commissions, and reparations. This topic provides insights into the challenges of achieving justice in the aftermath of such events.

Module 21

Code	Course/Module Title	ECTS	Semester
CE312	Theory of Structure	10	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
8	0	122	128

Description

Part I: Statically Determinate Structures

Types of structural elements, Types of structures, Types of loads, Types of supports, Equations of equilibrium, Equations of condition, Determinacy and stability.

Internal loadings developed in structural members, sign convention, Shear force and bending moment diagrams for a beam, Relationships between load, shear force and bending moment, Moment diagrams by method of superposition, Shear and moment diagrams for a frame.

Determinacy and stability of trusses, The method of joints, The method of sections.

Influence lines for statically determinate structures, Influence lines for beams, Relationships of influence lines and structural loading, Influence lines for trusses, Moving loads on beams, Absolute maximum moment in a beam.

Approximate analysis of statically indeterminate structures, Indeterminate trusses, Vertical loads on building frames, Lateral loads on building frames: portal method.

Deflection of a beam, Significance of beam deflections, Double integration method, Singularity function method, Moment-area method.

Part II: Statically Indeterminate Structures

Force methods, Method of consistent deformations, Basic procedure, Primary structure, Redundant reaction components.

Displacement methods, The slope-deflection method, Derivation of the slope-deflection equations, Application of the slope-deflection method to the analysis of statically indeterminate beams, Analysis of rigid frames without joint translation.

The moment distribution method, General description of the moment distribution method, Distribution factor, Procedure, Modified stiffness factor for hinged far end,

Support settlement, Application of moment distribution to frames without sidesway.

Energy methods, Strain energy in an elastic system: axial loading, flexural loading, Castigliano's theorem method, Joint displacement in trusses,

Module 22

Code	Course/Module Title	ECTS	Semester
CE316	Soil Mechanics	9	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	2	92	133

Description

The aim of this module is to learn the students how to;

1. Compute the soil stability under the effect of ground water
2. Classify the soil
3. Compute the factor of safety against the piping , boiling and heaving
4. Compute the percent of compaction
5. Compute the max. density and the optimum moisture content
6. Compute the increasing the stress due the surface load
7. Compute the amount the final settlement due to the surface load
8. Compute the settlement at a finite time
9. Compute the shear strength of soil
10. Compute the factor of safety against the failure at any plane

On successful completion of this module, students will be able to;

1. Compute the soil stability under the effect of ground water
2. Classify the soil
3. Compute the factor of safety against the piping , boiling and heaving
4. Compute the percent of compaction
5. Compute the max. density and the optimum moisture content
6. Compute the increasing the stress due the surface load
7. Compute the amount the final settlement due to the surface load
8. Compute the settlement at a finite time
9. Compute the shear strength of soil
10. Compute the factor of safety against the failure at any plane

Module 23

Code	Course/Module Title	ECTS	Semester
CE311	Engineering & Numerical Analysis	8	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	0	92	108

Description

1- Knowing types and classification of differential equations.

2- Ability to solve first order ordinary differential equations.

3- Recognizing some engineering applications on first order DE.

4- Ability to solve second and higher order linear ordinary DE.

5- Recognizing some engineering applications on second order DE.

6- Ability to solve a set of ordinary DE.

7- Ability to use matrices in solving a set of algebraic equations.

8- Identifying numerical methods and when to use them.

9- Ability to solve algebraic equations numerically.

10- Ability to solve a set of algebraic equations numerically.

11- Derivation of different functions by numerical methods.

12- Performing numerical integration to different functions.

13- Solving ordinary DE numerically.

14- Finding a suitable curve for a set of points.

15- Performing interpolation and extrapolation to approximate required functional value.

Module 24

Code	Course/Module Title	ECTS	Semester
CE315	Computer applications	3	5
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
0	2	32	43

Description

Teaching undergraduate students how to deal with applied engineering programs, such as the ETABS program used to analyze and design steel and concrete structures, as well as the Microsoft project program used in planning construction projects, estimating costs, project completion period, and controlling and evaluating projects.

1- Teaching students how to deal with construction programs in an integrated manner and compare with the theoretical study of designing and analyzing structural members and how to shed loads on structural buildings of all kinds.

2- Teaching students how to create bills of quantities for construction projects by controlling the course of work for the construction project, as well as the possibility of estimating the quantities of construction materials in general.

Module 25

Code	Course/Module Title	ECTS	Semester
CE322	Reinforced concrete design	10	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
8	0	122	128

Description

The aim of the course on reinforced concrete design according to the ACI code is to provide students with the necessary knowledge and skills to design safe and efficient reinforced concrete structures. The course aims to:

1.Familiarize students with the principles and concepts underlying reinforced concrete design.

2.Introduce participants to the ACI code and its requirements for reinforced concrete design.

3.Develop proficiency in the strength design method used for reinforced concrete structures.

4.Equip students with the ability to design rectangular beams with single and double reinforcement.

5.Enable participants to analyze and design T-beams.

6.Familiarize students with the analysis and design of continuous beams, one-way slabs, two-way slabs, columns, and load calculations on columns.

7.Create awareness of important design considerations such as constructability, sustainability, and quality control.

8.Enhance critical thinking and evaluation skills in structural design.

By the end of the course, students will be equipped with the necessary tools and understanding to confidently design reinforced concrete structures in compliance with the ACI code, ensuring safety, efficiency, and adherence to industry standards.

Module 26

Code	Course/Module Title	ECTS	Semester
CE317	Drainage and irrigation engineering	9	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	0	92	133

Description

1.Preparing and qualifying the civil engineer to meet the requirements of the labor market in the private and public sectors in irrigation and drainage engineering through diversifying the use of learning and teaching methods and training students to apply the acquired knowledge and skills to solve real problems of irrigation and drainage engineering designs.

2.Presenting different designs of irrigation and drainage engineering methods, both theoretical and practical, to comply with international standards of academic quality and meet the needs of the labor market.

3.Develop the knowledge and the method of scientific research in the field of irrigation and drainage engineering in a way that contributes to developing the design method, managing water resources and reducing waste in water resources.

4.Preparing a scientific basis to keep pace with scientific development and pave the way for studying accurate topics in this specialty.

5.It serves the needs of the governmental and private sectors and the society in all its institutions to establish irrigation and drainage systems.

Module 27

Code	Course/Module Title	ECTS	Semester
CE319	Traffic Engineering	8	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	2	92	108

Description

This module will present the basic design concepts of Traffic Engineering to the students. The module will also present the Intersection Control and Design to the students.

In addition to presenting the basic concepts of Transportation Engineering and Planning to the students which includes trip generation, trip distribution, traffic assignment and modal split. Also, the module will introduce an introduction to the Public Transportation.

The students will be able to:

1-Identify and define the Traffic Operations at the highways by conducting several traffic surveys and studies such as Speed, Volume, Capacity, Travel Time, Delay, and Parking; and build the relationship among the traffic stream parameters.

2-Also, the students will be able to identify the basic concepts of Traffic Control and will be able to design an at-grade Intersection Control.

3-In addition, the students will also be able to identify where the trips come from and where they go, and what modes and which routes will be used.

4-Also, the students will be able to identify the basic concepts of public Transportation and will be able to design and construct Bus Time schedules and determine the capacity of Bus Stops.

Module 28

Code	Course/Module Title	ECTS	Semester
CE318	Project management and engineering economics	3	6
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	43

Description

- To understand the project management skills in building industry and other engineering projects.
- To acquire the important knowledge and experience on contract management in real life projects.
- To appreciate the techniques of project planning and control.
- To understand the skills needed for engineering economics and company finance.
- To appreciate the significance of the economic aspect of engineering in their decision making.
- To master the fundamental concepts of economic analysis necessary to bridge the gap between the physical and economic aspects of engineering applications.

Module 29

Code	Course/Module Title	ECTS	Semester
CE422	Design of concrete structure	9	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	0	92	133

Description

The aim of this course is to provide participants with a comprehensive understanding of the principles, methods, and practices involved in designing reinforced concrete structures. The course aims to equip participants with the necessary knowledge and skills to design safe, efficient, and sustainable concrete structures while adhering to relevant design codes and standards. The course seeks to achieve the following objectives:

1)Familiarize students with advanced concepts and methodologies in reinforced concrete design, including design of two-way slab on beam, design of flat slab, design of flat plate slab, design of waffle slab, unsway slender column analyses and design, sway slender column analyses and design, prestress analyses and design, and raft foundation design.

2)Develop students' proficiency in analyzing and designing unsway slender columns, considering axial load, moment, and reinforcement requirements.

3)Enable students to analyze and design sway slender columns, taking into account lateral loads, effective length, and lateral stability requirements.

4)Provide students with the necessary knowledge and skills to analyze and design prestressed structures, considering prestressing principles, beam and slab design, and detailing requirements.

5)Foster critical thinking and problem-solving abilities through theoretical discussions, problem-solving exercises, and design projects.

6)Enhance students' ability to interpret and apply relevant design codes and standards in the context of advanced reinforced concrete design.

7)Promote effective communication of design decisions and solutions.

8)Prepare students for advanced studies or professional practice in the field of reinforced concrete design.

Module 30

Code	Course/Module Title	ECTS	Semester
CE111	Foundation Engineering	8	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	6	92	108

Description

This course is intended to;

1. To evaluate the general suitability of the site and enable adequate and economical design for the proposed project
2. Calculate the safe bearing capacity of soils.
3. Estimate the settlement of shallow foundations
4. Estimate the size of shallow foundations to satisfy bearing capacity and settlement criteria.
5. Provide the steps of structural design for shallow foundations.
6. Determine the allowable axial load capacity of single piles and pile groups.
7. Determine the settlement of single pile and pile groups.
8. Understand and determine lateral earth pressure.
9. Understand the forces that lead to instability of earth retaining structures.
10. Determine the stability of eath retaining structures (retaining walls, sheet pile walls, braced excavation).

Module 31

Code	Course/Module Title	ECTS	Semester
CE417	Engineering Hydrology	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	0	92	108

Description

This course serves as an introduction to the field of engineering hydrology. It covers fundamentals such as the hydrological cycle, catchment, hyetographs, losses, and hydrographs. Design topics covered will be selected from: flood frequency analysis, determination of design rainfall intensity and hyetographs, peak flow estimation, design hydrograph estimation, and groundwater process.

The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, and interactive tutorials.

Module 32

Code	Course/Module Title	ECTS	Semester
CE418	Method of construction and estimation	5	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	0	62	63

Description

This is an introductory course on Construction Methods and Estimation, focusing on fundamental concepts, principles and techniques. The course will introduce basic Construction concepts, including: Construction planning and methods, methods and equipment for soil stabilization and compaction, construction equipment for cut fill transport of soil, soil excavation equipment, construction quantity estimation, building material specifications.

Topics covered in this course include: planning, construction metho stabilization and compaction, construction equipment, excavation equipment, construction quantity estimation, building material specifications.

At the end of the course, students are expected to learn:

1- Be able to explain construction methods concepts and principles.

2- Be able to contrast between different types of construction equipment based on its specifications and use

. 3- Be able to describe soil layers and specifications, methods and equipment of soil stabilization

Module 33

Code	Course/Module Title	ECTS	Semester
CE415	Harbor Engineering	3	7
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	43
Description			
Students learn about marine transport, sea port engineering and cargo technologies. They are able to use smart technologies and implement the ideas of smart autonomous port or e-logistics, and also develop strategic technologies. The study programme comes with a specialisation - Maritime Transport Logistics – which allows students to create and develop supply and logistics chains, understand the role of centres and platforms, and to solve complex tasks of standard and non-standard cargo transportation.			

Module 34

Code	Course/Module Title	ECTS	Semester
CE412	Steel structure design	8	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	0	92	108

Description

1- Understanding steel as a structural material, and get knowledge of its mechanical properties.

2- Familiarity with design codes and standards.

3- Learning to identify and evaluate the various loads.

4- Acquiring the skills to design beams and plate girders

5- Design of tension members

6- Design of compression members.

7- Understanding the principles and techniques for designing steel connections

By the end of the course, the students should have the necessary knowledge and skills to design safe and efficient steel structures in accordance with the applicable codes and standards. The acquired knowledge includes:

1- Properties of steel.

2- Information about the applicable code and standards.

3- Design of beams.

4- Plate girders.

5- Tension members.

6- Compression members.

7- Connections.

Module 35

Code	Course/Module Title	ECTS	Semester
CE422	Sanitary Engineering	8	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
6	2	62	88

Description

The aim of this module is to learn the students how to;

1. compute the quantity of potable water,
2. recognize the materials used in piping works,
3. design water pumping stations,
4. design water treatment systems,
5. assess the environmental impact of untreated sewage discharge,
6. compute the quantity of sanitary sewage,
7. compute the quantity of storm water,
8. design sewer systems,
9. design sewage treatment systems, and
10. design sludge treatment systems.

On successful completion of this module, students will be able to;

1. compute the quantity of potable water for a specific city,
2. select the appropriate piping material,
3. analyze and design water networks,
4. design water pumping stations,
5. design water treatment systems.
6. compute the quantity of sanitary sewage for a specific city,
7. compute the quantity of storm water,
8. design sanitary sewer system,
9. design storm sewer system,
10. design sewage treatment systems.
11. design sludge treatment systems

Module 36

Code	Course/Module Title	ECTS	Semester
CE419	Highway Engineering	6	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	38

Description

1-Gives us an idea about the roads of ancient times.

2-The emphasis of the geometric design is to address the requirement of the driver and the vehicle such as safety, comfort, efficiency, etc.

3-The characteristics of cross-sectional elements are important in highway geometric design because they influence safety and comfort.

4-Horizontal alignment is one of the most important features influencing the efficiency and safety of a highway.

5-Knowledge and Understanding of highway design features.

6-Bituminous materials, Natural Asphalt, constituents of asphalt cement, and test of asphalt.

7-The emphasis of the different aggregate characteristics with size and gradation, and methods of blending for dry mix design.

8-Bituminous mix design, with the objective of mix design.

9-Study of stress distribution through the pavement with the calculation of flexible pavement stresses and deflections.

10-Knowledge and Understanding of pavement design and analysis.

Module 37

Code	Course/Module Title	ECTS	Semester
CE413	Hydraulic engineering	4	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	0	62	38

Description

1-Discuss the types of hydraulic structures according to its purposes.

2-Discuss the causes of failure of hydraulic structures .

3-Explain the different methods of floor design of the hydraulic structures.

4-Define and explain of the energy dissipation structures.

5-Define and design of stilling basins.

6-Explain and design of different types of culvert.

7-Discuss and design of pipe aqueduct and flume.

8-Define and design of siphon.

9-Study and design a steel vertical gate

Module 38

Code	Course/Module Title	ECTS	Semester
CE420	Engineering Project	4	8
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0	32	68
Description			
1. - Ensuring the capabilities of the graduate student to invest what he possessed of knowledge structures and writing, research and documentation capabilities during his study stage. 2. - Giving the graduate student an opportunity to apply what he learned and implement it in the vital field of his major. 3. Establishing the value of scientific honesty in research and research writing during the stages of documenting and writing the research report. 4. - Provide an opportunity for the graduate student to work collaboratively if he works within a team 5. - Enhancing the student's value and skill system by enabling him to choose, apply, research, conclude, analyze and adhere to the values of scientific integrity and the ethical values of scientific research.			

Contact

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Iraq University College

كلية العراق الجامعة

First Cycle – Bachelor's Degree (B.Sc.) –
Civil Engineering
بكالوريوس - هندسة مدنية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**E111**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level		1	**Semester of Delivery**		1
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Good understanding of General Mathematics. 2. To give information about Integrations and derivations and how they are used in the physics field. 3. Helping students to connect mathematics with physics. 4. solving mathematical examples in their physics modules. 5. better understanding of integration and derivations and their importance of them in physics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After successful completion of the module, students should be able to: 1. Work with functions represented in various ways: graphical, numerical, analytical, or verbal. They should understand the connections among these representations. The functions include linear, polynomial, absolute value, rational, exponential, logarithmic, trigonometric, inverse trigonometric, hyperbolic, inverse hyperbolic, and piecewise defined functions. 2. Define and apply the concepts of limits and continuity to the mentioned functions and study them graphically and analytically. 3. Understand the meaning of the derivative in terms of a rate of change and local linear approximation, and should be able to use derivatives to solve a variety of problems. 4. Understand the meaning of the definite integral both as a limit of Riemann sums as the net accumulation of change and should be able to use integrals to solve a variety of problems. 5. Understand the relationship between the derivative and the definite integral as expressed in both parts of the Fundamental Theorem of Calculus. 6. Use various integration techniques to obtain anti-derivatives without an integral table or calculator.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Different forms of teaching will be used to come across with objectives of the course. PowerPoint presentations for the head titles, definitions, graphs, and many useful illustrations with a summary at the end of each chapter will be presented and discussed. 2. The PowerPoint contains information about new topics and unsolved examples, and then the whiteboard will be used to solve them and to let students to see the solutions.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)		
	Assignments	2	10% (10)		
	Projects / Lab.	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	**Midterm Exam**	2hr	10% (10)		
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Matrices, Types of Matrices
Week 2	Basic Matrix Operations, Addition and Subtraction of Matrices, Product of Matrices
Week 3	Determinants, The inverse of Matrix, Solving Systems of Equations by Cramer's Rule, Solving Systems of Equations by inverse matrix
Week 4	Solving inequalities, definition of Function, Domain and Range of a Function
Week 5	Types of Functions, the Limit process, continuity
Week 6	Derivative, Basic rules of differentiation, Derivation formulas of trigonometric, logarithmic, and exponential functions, Logarithmic differentiation technique
Week 7	Mid-term Exam + Implicit differentiation, Inverse trigonometric functions,
Week 8	Derivatives of the inverse trigonometric functions, Differentiation applications(L hopital Rule)
Week 9	Indeterminate Powers, Partial Derivatives, Functions of More Than Two Variables,
Week 10	Second-Order Partial Derivatives, Total derivatives,
Week 11	definition of Integration, Basic formulas for integration, Some Important Identical
Week 12	Integrals give inverse trigonometric functions
Week 13	METHODES 0F INTEGRAL, Integration by Parts
Week 14	Integration by Parts Formula for Definite Integrals
Week 15	Integration of Rational Functions by Partial Fractions
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Calculus with Analytical Geometry, Fourth Edition, By Robert Ellis and Denny Gulick, 1990. 2. Calculus, Fifth Edition, By Stanley I. Cross may1992. Calculus, International Edition, By Thomas, 2005.	Yes
Recommended Texts	1. Calculus, 11th Edition, By Thomas, 2013. Understanding Basic Calculus, by S.K. Chung, 2007	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	**Engineering Drawings**			**Module Delivery**	
Module Type	**Core**			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CE111**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name (if available)		**e-mail**	E-mail	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**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 the students to identify the tools/instrument needed. 2. To familiarize the student, with the proper techniques, manipulation, uses, and care of the drawing instruments. 3. To introduce the students to a specific language of engineers which is a graphical language. 4. To help and guide the students to learn how technical drawings can be drawn in different methods. 5. To acquire some different skills such as the ability to read and prepare engineering drawings, the ability to make free-hand sketching of objects, the power to imagine, analyze, and communicate, and the capacity to understand other subjects. 6. To acquire adequate skills in measuring/scaling dimension accurately, and the method of placing dimensions. 7. To acquire basic analysis skills in orthographic/section/isometric drawing 8. To know the proper drawing conventions/symbols to describe the engineering drawings.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Get information about the important tools for engineering drawing. This will give student basic knowledge of technical drawings professions and means of communications to others. 2. Knowing the types of lines and their applications in technical drawings. 3. Learning the steps to construct different geometric figures like lines, arcs, polygon, ellipse etc. which is essential for engineer. 4. Comprehend general projection theory, with emphasis on orthographic projection to represent three-dimensional objects in two-dimensional views. 5. Develop student's imagination and ability to represent the shape size and specifications of physical objects. 6. Learning how to draw sectional views. 7. Knowing how to place dimensions on engineering drawings. 8. Equipped with the skill that enables the students to convert orthographic projection into isometric projection.

Indicative Contents المحتويات الإرشادية	Introduction to Engineering Drawing, Drawing Tools, Pencils, Drawing Sheets, Title Block of a Sheet, Types of Lines and their Uses. (10 hrs) Exercises in the Use of Instruments: Straight lines (Solid, Dashed and Center Lines), Circles and Tangents. (10 hrs) Graphic Geometry: Bisections, Parallels, Divisions, Angles, Geometric Shapes Tangents (Straight and Curved Lines), Ellipse. (30 hrs) Orthographic Projection: Theory, Orthographic Views, Representation of Lines, Hidden Features, Center Lines. Precedence of Lines, Exercises in Projection. (30 hrs) Sectional Views: Definition, Classification, Full and Half Sections, Exercises in Sectional Views. (20 hrs) Dimensioning Practices: Introduction, Terminology and Conventions, Exercises in Dimensioning. (10 hrs) Introduction to Types of Pictorial Drawing: Pictorial Methods Classified, Isometric. (10 hrs) Isometric Drawing: Perspective Drawing, Sketching, Layout of Circles, Exercises in Isometric Drawings. (30 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, lectures and by considering a variety of assignments that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5,10	1,2,3,4,5,6
	Assignments	12	15% (15)	2,3,4,5,6,7, 9,10,11,12,13 ,14	1,2,3,4,5,6,7,8
	Projects / Lab.	15	15% (15)	1,2,3,4,5,6,7, 8,9,10,11,12, 13,14,15	1,2,3,4,5,6,7,8
	Report				
Summative assessment	Midterm Exam	2 hr	10% (10)	8	1,2,3,4,5
	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 engineering drawing and graphic instruments and their uses
Week 2	Exercises in the use of instruments
Week 3	Graphic geometry I
Week 4	Graphic geometry II
Week 5	Graphic geometry III
Week 6	Orthographic Projection I
Week 7	Orthographic Projection II
Week 8	Orthographic Projection III
Week 9	Sectional Views I
Week 10	Sectional Views II
Week 11	Dimensioning Practices (introduction, terminology and conventions)
Week 12	Introduction to types of Pictorial Drawing
Week 13	Isometric Drawing I
Week 14	Isometric Drawing II
Week 15	Isometric Drawing III
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	الرسم الهندسي المؤلف: عبدالرسول الخفاف بغداد – 1990	No
Recommended Texts	The Fundamentals of Engineering Drawing & Graphic Technology, Fifth Edition Thomas E. French & Charles J. Vierck	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	Engineering Geology			**Module Delivery**	
Module Type	Basic leaning activities			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CE114				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Civil Eng. Dept.		**College**	IUC. Education	
Module Leader	Dr. Majeed Abbood Al-Taie		**e-mail**	Majeed Abood IUC education	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D	
Module Tutor	Dr. Majeed Abbood Al-Taie		**e-mail**	Majeed Abood IUC education	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Engineering Geology is defined as the discipline of applying geologic data, techniques, and principles to the study both (a) naturally occurring rock and soil materials, and surface and sub-surface fluids and (b) The interaction of the introduced materials and processes with the geologic environment , so that geologic factors affecting the planning, design, construction, operation and maintenance of engineering structures (fixed works) and development, protection, and remediation of ground water resources or, adequately recognized, interpreted for use in engineering and related practice
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Attaining the Aims: Engineering Geology is based on three simple premises these are: 1- All engineer works are built in or on the ground. Generally the work of designing and executing s project is sub-divided between various types of engineers, architect and planners so that no single person may have a comprehensive overview of the complete project , thus the virtual concept that the structure that the structure is but an extension of the ground may be lost. 2- The ground will always, in some manner react to the construction of the engineering work. The premise that the ground will always react to the construction of the engineering work. The problem is to assess the magnitude and nature of the reaction of the ground to both the construction and operation of the project, depending on the nature of site geology and the engineering work.it will operate within the bounds of the site geological conditions without sustaining significant damage as the result of the reaction of the ground . 3- The third premise is the engineering behavior to the particular engineering work must be accommodated by that work.. These are summarized by A- Material properties mass fabric = mass properties B- Mass properties + environment = the engineering geological situation C- The engineering geological situation + changes produced by engineering work = the engineering behavior of the ground
Indicative Contents المحتويات الإرشادية	Chapters 1- Introduction: Geology branches, engineering geology and its importance for civil engineer (2hrs) 2- Minerals: Common – rock forming mineral groups and their identification (4hrs) 3- Igneous rocks: origin of igneous rocks (plutonic, volcanic rocks) common igneous rocks and their identification (4hrs) 4- Sedimentary rocks: origin of the sedimentary rocks, classification of sedimentary rocks and identification (4hrs) 5- Metamorphic rocks: types of metamorphism and common types of metamorphic rocks and their identification (4hrs) 6- Geologic structures: types of folds, types of faults and joints (4hrs)

	7- Surface processes: weathering erosion, types of weathering and results of chemical weathering on some minerals (2hrs) 8- Clay minerals: groups of clay minerals (Kaolinite, illite, montmorillonite) (4hrs) 9- Physical and engineering properties of soils and rocks: porosity, permeability, water content, relative density, clay sensitivity and stresses on rocks (4hrs) 10- Ground water and water supply : origin, division of ground water, water table, aquifer, artesian water, types of wells, field permeability of formation transmissivity, specific yield, and retention (4hrs) 11- Mountain movements and earth eques and their effects on engineering works ,and the use of geophysical methods in engineering works (resistivity, seismic methods) (4hrs) 12- Effects of folds and faults on civil engineering contraction works (4hrs) 13- Brief review on topographic and geologic maps: construction of contour maps, cross- section of topographic and geologic profiles section, and borehole records interpretation (4hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes				
	Assignments				
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam	2hr	10% (10)		
	Final Exam	3hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction: Geology branches, engineering geology and its importance for civil engineer (2hrs)
Week 2	Minerals: Common – rock forming mineral groups and their identification (4hrs)
Week 3	Igneous rocks: origin of igneous rocks (plutonic, volcanic rocks) common igneous rocks and their identification (4hrs)
Week 4	Sedimentary rocks: origin of the sedimentary rocks, classification of sedimentary rocks and identification (4hrs)
Week 5	Metamorphic rocks: types of metamorphism and common types of metamorphic rocks and their identification (4hrs)
Week 6	Geologic structures: types of folds, types of faults and joints (4hrs)
Week 7	Surface processes: weathering erosion, types of weathering and results of chemical weathering on some minerals (2hrs)
Week 8	Clay minerals: groups of clay minerals (Kaolinite, illite, montmorillonite) (4hrs)
Week 9	Physical and engineering properties of soils and rocks: porosity, permeability, water content, relative density, clay sensitivity and stresses on rocks (4hrs)
Week 10	Ground water and water supply : origin, division of ground water, water table, aquifer, artesian water, types of wells, field permeability of formation transmissivity, specific yield, and retention (4hrs)
Week 11	Mountain movements and earth eques and their effects on engineering works ,and the use of geophysical methods in engineering works (resistivity, seismic methods) (4hrs)
Week 12	Effects of folds and faults on civil engineering contraction works (4hrs)
Week 13	Brief review on topographic and geologic maps: construction of contour maps, cross- section of topographic and geologic profiles section, and borehole records interpretation (4hrs)
Week 14	
Week 15	
Week 16	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Minerals identification (2hrs)
Week 2	Minerals exam (2hrs)
Week 3	Igneous rocks identification (2hrs)
Week 4	Igneous rocks exam (2hrs)
Week 5	Sedimentary rock identification (2hrs)
Week 6	Sedimentary rock exam (2hrs)
Week 7	Metamorphic rock identification (2hrs)
Week 8	Metamorphic rock exam (2hrs)
Week 9	Topographic maps concepts (2hrs)
Week 10	Construction of topographic from a field data using compass, Level ….etc (2hrs)
Week 11	Drawing topographic profiles from contour maps (2hrs)
Week 12	Three points problems (2hrs)
Week 13	How to find strike and dips of geologic strata (2hrs)
Week 14	Interpretation of borehole records (2hrs)
Week 15	Laboratory exams in topographic maps (2hrs)

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering and general geology for civil engineers Prof. Parbin, Singh eight revised edition	Yes
Recommended Texts		
Websites	Websites specialized in geology	

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 Workshop**			**Module Delivery**	
Module Type	Support			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	E113				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Civil Engineering		**College**	IRAQ University College	
Module Leader	Dr Kamil Alshammaa		**e-mail**	Kamil.alshamma@yahoo.com	
Module Leader's Acad. Title			**Module Leader's Qualification**	Doctorate	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Safety in workshop 2. Various methods used for safety ; Helmut –glasses-Non slip shoes ect 3. First aid regulations 4. Safety in fires – electric shocks –accident prevention 5. Measurement techniques 6. The Lathe machine description 7. Operations made on Lathe MC 8. Milling MC 9. Various tools and operations on Milling MC 10. Drilling MC 11. The arc welding for welding
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student will be able to do certain operations on Lathe MC and others like Milling 2. He will understand how to avoid nasty accidents 3. He will be able to use the various tools to make certain cuts 4. He will be able to make better measurements
Indicative Contents المحتويات الإرشادية	The student will be able to understand the relation between the machine and man. He will use the MC to do his aims .

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. TEACHING THE student how to use machine to his advantage. 2. Making the safety in workshop of paramount importance 3. To know the exact motion which will give the desired result.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	43	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
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	20		
	Assignments	1	10		
	Projects / Lab.				
	Report	1	10		
Summative assessment	Midterm Exam	2hr	10% (10)		
	Final Exam	3hr	50% (50)	16	all
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Safety in workshop
Week 2	THINGS to wear in workshop
Week 3	Objects of dangerous use
Week 4	FIRES – electrocution - avoidance and to deal with the outcome
Week 5	Measuring methods . Use of calipers , Vernier, Micrometers
Week 6	USE of Lathe machine
Week 7	Operations on Lathe MC
Week 8	Three and four jaw chuck
Week 9	Milling MC and its uses
Week 10	Fixed tool for milling MC
Week 11	THE DRILLING mc
Week 12	Drilling holes on circular arcs
Week 13	The arc welding
Week 14	Welds and how the are designed
Week 15	**Examples to show the application of the above**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Safety in workshop
Week 2	Various things to wear for safety
Week 3	Measurement techniques
Week 4	The Lathe MC and operations
Week 5	The milling MC
Week 6	The drilling MC
Week 7	The arc welding

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		no
Recommended Texts		no
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Physics**			**Module Delivery**	
Module Type	**Support**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**E116**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level		1	**Semester of Delivery**		1
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. **Fundamental Principles:** Provide a foundational understanding of physics principles, including mechanics, thermodynamics, and fluid dynamics. 2. **Materials Knowledge:** Familiarize students with the properties of materials relevant to civil engineering, such as elasticity and stress. 3. **Applied Concepts:** Apply physics concepts to analyze structural systems, electrical systems, and environmental forces. 4. **Hands-on Experience:** Incorporate practical laboratory work to reinforce theoretical learning. 5. **Safety and Interdisciplinary Awareness:** Stress safety practices and interdisciplinary connections in civil engineering projects. 6. **Critical Thinking and Communication:** Develop problem-solving skills and effective communication for engineering applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. **Fundamental Physics Knowledge:** Understand and apply fundamental physics principles to civil engineering problems. 2. **Materials and Structural Analysis:** Analyze material behavior and structural equilibrium using physics concepts. 3. **Fluid Mechanics and Thermodynamics:** Apply physics principles to analyze fluid flow, heat transfer, and environmental forces. 4. **Electrical Systems Understanding:** Comprehend the principles of electricity and magnetism relevant to civil engineering applications. 5. **Practical Skills:** Gain proficiency in laboratory work, problem-solving, and effective communication. 6. **Safety and Interdisciplinary Awareness:** Emphasize safety and ethical considerations and collaborate across engineering disciplines.

Indicative Contents المحتويات الإرشادية	1. **Introduction to Physics Principles:** o Basic concepts of physics o Units and measurements o Scalar and vector quantities 2. **Mechanics:** o Kinematics (motion) o Dynamics (force, Newton's laws) o Equilibrium of particles and rigid bodies o Friction and its applications o Moments and couples o Center of mass and centroid calculations 3. **Materials and Properties:** o Material properties (elasticity, stress, strain) o Stress and strain analysis o Hooke's law and modulus of elasticity o Material behavior under load (tensile, compressive, shear) o Material selection for civil engineering applications 4. **Fluid Mechanics:** o Properties of fluids (density, viscosity) o Fluid statics (pressure distribution) o Fluid dynamics (Bernoulli's equation, continuity equation) o Flow in pipes and open channels o Hydraulic principles and applications in civil engineering 5. **Safety and Ethics:** o Safety procedures and practices in experimental work o Ethical considerations in engineering practice 6. **Interdisciplinary Applications:** o Integration of physics principles into various civil engineering disciplines (structural, geotechnical, transportation, environmental) 7. **Problem-Solving and Applications:** o Application of physics concepts to solve real-world civil engineering problems o Case studies and practical examples 8. **Communication Skills:** o Technical report writing o Presentation skills for communicating engineering solutions These indicative contents provide a comprehensive overview of the topics that may be covered in a physics module for civil engineering students. The specific content and depth may vary depending on the course and institution.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. **Lectures:** Deliver comprehensive theoretical content. 2. **Problem-Solving Sessions:** Engage students in applying physics to engineering challenges. 3. **Group Discussions:** Foster interdisciplinary awareness and collaborative skills. 4. **Case Studies:** Analyze real-world applications. 5. **Assignments and Assessments:** Evaluate understanding and promote critical thinking.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	43	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
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)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Course overview, units, and measurements
Week 2	Scalars and vectors, basic kinematics
Week 3	Dynamics (force, Newton's laws)
Week 4	Equilibrium of particles and rigid bodies
Week 5	Friction, moments, and couples
Week 6	Center of mass, centroid calculations
Week 7	Material properties (elasticity, stress, strain
Week 8	Stress and strain analysis, Hooke's law
Week 9	Properties of fluids, fluid statics
Week 10	Fluid dynamics (Bernoulli's equation, continuity)
Week 11	Laws of thermodynamics, heat transfer mechanisms
Week 12	Thermal expansion, energy conservation
Week 13	Electric charge, electric potential, basic circuits
Week 14	Magnetism, electromagnetic induction, electrical systems
Week 15	Review and Applications
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Physics for Scientists and Engineers" by Serway and Jewett	No
Recommended Texts	"Fundamentals of Physics" by Halliday, Resnick, and Walker.	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	Engineering Mechanics			**Module Delivery**	
Module Type	Core			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CE112				
ECTS Credits	10				
SWL (hr/sem)	250				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Civil Engineering		**College**	IRAQ University College	
Module Leader	Dr Kamil Alshammaa		**e-mail**	Kamil.alshamma@yahoo.com	
Module Leader's Acad. Title			**Module Leader's Qualification**	Doctorate	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Finding the resultant force by using the rectangular and non- axes 2. Finding the reactions for equilibrium case with solved problems 3. The structures and the reactions and finding the forces 4. Method of joint and method of section to the reactions 5. To calculate the instant equilibrium and finding the forces 6. Finding the moment of a force and applying it 7. Derivation of the general equation of motion 8. Examples on solving many problems on the above 9. The centroid was calculated with many examples 10. Stating of the dynamics and the acceleration 11. Constant acceleration. Motion and equations 12. Study of general equation of motion 13. Examples are solved 14. The effect of the Inertia force 15. The inertia force is drawn thus: a. Against the direction of acceleration b. Passes through the centroid of the object c. If is equal to mass X acceleration 16. Many problems were solved 17. Work= increase of kinetic energy is an important law to find the new velocity after work has been done on the body
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student will be able to analyze the notion and find the force causing it 2. He will apply the equation of motion and get the necessary information 3. He will understand the value of the inertia force and its application 4. He will know how to use the work equal the increase the kinetic energy
Indicative Contents المحتويات الإرشادية	The mechanics study is very important in analyzing the motion of a body. It is also very important in finding the equilibrium and to calculate forces and moments

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Many different types of methods to get the information assimilated . For example the use of solving many examples which were to solve different Questions.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	122	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	10
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	128	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	8.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**250**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20		
	Assignments	2	10		
	Projects / Lab.				
	Report	1	10		
Summative assessment	**Midterm Exam**	2hr	10% (10)		
	Final Exam	3hr	50% (50)	16	all
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Vector addition , subtraction , Finding the resultant of many forces
Week 2	EXAMPLES
Week 3	Finding the resultant of a coplanar system of forces with many examples
Week 4	Finding the equation of motion
Week 5	Applying the knowledge to draw the FBD and to use it in applications
Week 6	Solving many problems
Week 7	Applying the method of joints and the section method to structures
Week 8	Solving many problems for proving the above
Week 9	Revision of the previous points on many examples
Week 10	Beginning of the accelerates motion : Constant acceleration
Week 11	Finding the equation of motion and its applications
Week 12	Choosing the inertia that will be necessary to solve the problem
Week 13	Calculating of the inertia force and use it to solve
Week 14	Use of: work = increase in kinetic energy
Week 15	**Examples to show the application of the above**
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Bear and Johnston , Engineering mechanics	no
Recommended Texts		
Websites		

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Building Material**			**Module Delivery**	
Module Type	**Core**			☑ **Theory** ☑ **Lecture** ☑ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CE114**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	MSC	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- Definition of building materials and the importance of studying them. 2- Studying models of building materials. 3- How to deal with building materials and benefit from them. 4- History of building materials and ways to develop them. 5- Studying all the properties related to building materials, including physical, chemical, mechanical, etc.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Knowing the building materials used previously and at the present time. 2- Methods of preparing old and modern building materials. 3- The different properties of building materials. 4- Laws and equations related to each material. 5- Knowing the factors affecting these materials as well as ways to develop them.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The strategy used in this curriculum is to direct the student to study building materials and think about ways to develop them and understand their properties and everything related to them through studying them theoretically and conducting experiments for each material in the laboratory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)		
	Assignments	2	10% (10)		
	Projects / Lab.	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	Midterm Exam	2 hr	10% (10)		
	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 the science of building materials.
Week 2	General properties of building materials.
Week 3	General properties of building materials.
Week 4	Mechanical properties of engineering materials.
Week 5	Stress-strain curves for some materials.
Week 6	Modulus of elasticity for some engineering materials.
Week 7	Creeping and the factors affecting it and its curve.
Week 8	Fatigue and finding the limit of continuity.
Week 9	Bricks, their types, methods of classification and manufacture.
Week 10	Bricks, their types, methods of classification and manufacture.
Week 11	Wood, its composition and methods of preservation.
Week 12	Ferrous materials, their types, methods of preparation, and factors affecting them.
Week 13	Tiles, its types and specifications.
Week 14	Types of plaster and the most important gypsum products.
Week 15	Binding materials and their uses locally and their types.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction
Week 2	Brick test
Week 3	Iron test.
Week 4	Tiles test.
Week 5	Plaster test.
Week 6	Wood test.
Week 7	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Building materials science,	Yes
Recommended Texts	Natural building materials technology, For the author, Dr. Ahmed Ibrahim Al-Attiyah.	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	**English Language**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**U111**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr. Salman Dawood Salman		**e-mail**	dr.sds2020@gmail.com	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Preparing and qualifying the civil student-engineer to meet the requirements of the labor market in the private and public sectors through the use of learning and teaching methods and training. Students are prepared well enough to listen to English with understanding and speak it fluently in everyday communication. They are also helped to write reports and practice translation from and to English. 2. Presenting different engineering extracts by using power point slides and other available teaching/learning technologies such as the smart board and the data show. 3. Developing the knowledge and the method of scientific research in the field of civil engineering in a way that contributes to preparing a scientific basis to keep pace with scientific development and pave the way for students to study accurate topics. 4. Serving the needs of public and private sectors and the society in all of its institutions keeping in mind the needs of the labor markets both at home and abroad. The Bologna process which has been put into practice since the end of the last century, when twenty-nine European countries agreed to improve the academic level at their universities in 1999, will hopefully be of great benefit to whom academic improvement may concern.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Clarifying the basic concepts of English grammar and English language fluency systems and their application in the field of engineering. 2. Gaining experience in designing and running language sessions with reference to the different surrounding conditions.
Indicative Contents المحتويات الإرشادية	Hidden syllabus details would be referred to on the spot if there were any.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Students are mainly encouraged to participate in the exercises and language communication tasks with confidence. 2- Students are helped to improve and expand their critical thinking skills. This will be achieved through interactive tasks including some sampling communicative activities that are of interest to them.

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	5.5
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	4% (4)	2, 5, 10	
	Assignments	2	4% (4)	6, 12	
	Projects / Lab.	Cont.	12% (12)	Continuous	
	Report	2	5% (5)	8,11	
Summative assessment	**Midterm Exam**	1.5 hrs	15% (15)	9	
	Final Exam	2hrs	60% (60)	13	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	English as a world/international Language
Week 2	Engineering
Week 3	Our University College
Week 4	Review & Tutorial 1
Week 5	Drawings
Week 6	Wood
Week 7	Numbers
Week 8	Review & Tutorial 2
Week 9	Our Digital World: Four Speakers
Week 10	Energy
Week 11	Temperature & Change of State
Week 12	Review & Tutorial 3
Week 13	Energy Saving Devices
Week 14	Automation
Week 15	Manufacturing
Week 16	**General Review: Getting Prepared for the Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Ibbotson (2009) Professional English in Use: Engineering Ibbotson (2006) Cambridge English for Engineering Esteras (2008) Infotech: English for Computer Users	Yes
Recommended Texts	Al-Ghanim (2014) *Tips for Teaching easy sentence grammar* _____(2017)*English for the Students of Engineering*	No
Websites	www.cambridgeorg/9780521734882 www.cambridge.org/elt/englishforengineering	

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 software**			**Module Delivery**	
Module Type	**Support**			☐ **Theory** ✓ ☐ **Lecture** ✓ ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ✓ ☐ **Seminar**	
Module Code	**E115**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	none		**e-mail**	None	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• To knowledge of the most important components and basics of a computer • To understand algorithms and flowcharts • To learn how to use computer software (Word, Excel, and Power point)
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Knowledge of computer basics • Building an integrated algorithm for any program • Draw a flowchart for any program • Using Word and creating a Word file • Drawing charts using Excel • Perform all calculations and obtain results using Excel • Preparing a presentation using PowerPoint
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	43	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
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)	5,10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2,12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to computer**
Week 2	Computer programming language
Week 3	Flowcharts
Week 4	Algorithms
Week 5	Introduction to Microsoft word
Week 6	Word Tutorial
Week 7	Word Tutorial
Week 8	Introduction to Microsoft excel
Week 9	Find solutions for various mathematical operations
Week 10	How to insert different functions using Excel
Week 11	Draw charts using Excel
Week 12	Introduction to power point
Week 13	prepare a presentation using Power point
Week 14	Seminar
Week 15	Seminar
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Learning about computer parts and important tasks in Windows
Week 2	Learning the basics of the Word software by controlling the type, size and color of the font and other setting
Week 3	Learning how to insert an image, chart, text, etc.
Week 4	Learning the basics of the Excel and how to find the solutions for different equations
Week 5	Learn drawing different charts
Week 6	Learning the basics for power point
Week 7	Learning how to prepare a presentation using Power point

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Microsoft Word 2016 Step by Step An introduction to EXCEL for civil Engineers Microsoft Power Point 2016 Step by Step	No
Recommended Texts		
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Chemistry**			**Module Delivery**	
Module Type	**Support**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**E117**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level		1	**Semester of Delivery**		2
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. **Material Understanding: Comprehend the chemical properties and behavior of construction materials, enabling informed material selection and performance assessment.** 2. **Environmental Awareness: Evaluate the environmental impact of construction, focusing on sustainability and reducing ecological harm.** 3. **Corrosion and Protection: Recognize corrosion mechanisms in metals and apply preventive measures such as coatings and protection systems.** 4. **Water Quality Management: Understand water chemistry, treatment processes, and compliance with water quality standards.** 5. **Safety and Hazard Management: Identify hazardous materials and develop safe handling practices while adhering to regulations.** 6. **Interdisciplinary Skills: Promote collaboration between civil engineers and chemists to tackle complex infrastructure challenges and foster ethical decision-making in chemical use.**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. **Material Understanding: Comprehend the chemical aspects of construction materials and how chemistry influences their properties.** 2. **Environmental Assessment: Evaluate and propose sustainable practices while considering the environmental impact of construction materials and processes.** 3. **Corrosion Expertise: Identify corrosion mechanisms and recommend prevention strategies for metals used in civil engineering.** 4. **Water Quality Proficiency: Analyze water chemistry and design treatment processes to meet quality standards.** 5. **Safety and Compliance: Develop protocols for handling hazardous materials and ensure compliance with chemical-related regulations.** 6. **Collaboration and Ethics: Collaborate effectively across disciplines, apply research and innovation, and make ethical decisions regarding chemical use in civil engineering projects.**

Indicative Contents المحتويات الإرشادية	1. **Introduction to Chemistry in Civil Engineering**: o Importance of chemistry in civil engineering. o Historical developments and milestones in the field. 2. **Chemical Fundamentals**: o Atomic structure and the periodic table. o Chemical bonding and molecular structures. o Chemical reactions and stoichiometry. 3. **Materials Chemistry**: o Properties and characteristics of construction materials (e.g., concrete, steel, asphalt). o Chemical composition and structure of construction materials. o Chemical processes in material production (e.g., cement hydration). 4. **Corrosion and Deterioration**: o Corrosion mechanisms in metals and their prevention. o Chemical degradation of concrete and protective measures. o Chemical aspects of material durability. 5. **Chemical Testing and Analysis**: o Laboratory techniques for analyzing construction materials. o Interpretation of chemical test results. o Quality control and assurance in construction. 6. **Sustainable Chemistry in Civil Engineering**: o Sustainable construction materials and practices. o Green chemistry principles applied to civil engineering. o Recycling and reuse of materials. 7. **Chemical Safety and Hazard Management**: o Identification of hazardous materials commonly used in civil engineering. o Safety protocols for chemical handling and storage. o Regulations and compliance related to hazardous materials. 8. **Water and Wastewater Chemistry**: o Chemistry of water treatment processes. o Chemical reactions involved in wastewater treatment. o Water quality standards and testing methods. 9. **Environmental Regulations and Compliance**: o Environmental regulations related to construction projects. o Compliance with chemical-related regulations and reporting. These indicative contents provide a comprehensive overview of the chemistry topics relevant to civil engineering, ensuring that students have a strong foundation in chemistry for their future careers in infrastructure development and construction.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. **Lectures:** Deliver comprehensive theoretical content. 2. **Problem-Solving Sessions:** Engage students in applying physics to engineering challenges. 3. **Group Discussions:** Foster interdisciplinary awareness and collaborative skills. 4. **Case Studies:** Analyze real-world applications. 5. **Assignments and Assessments:** Evaluate understanding and promote critical thinking.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	43	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
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)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Chemistry in Civil Engineering
Week 2	Chemical Fundamentals
Week 3	Materials Chemistry
Week 4	Environmental Chemistry
Week 5	Corrosion and Deterioration
Week 6	Chemical Testing and Analysis
Week 7	Sustainable Chemistry in Civil Engineering
Week 8	Chemical Safety and Hazard Management
Week 9	Water and Wastewater Chemistry
Week 10	Environmental Regulations and Compliance
Week 11	Advanced Topics, Research, and Review
Week 12	Advanced Topics, Research, and Review
Week 13	Advanced Topics, Research, and Review
Week 14	Advanced Topics, Research, and Review
Week 15	Advanced Topics, Research, and Review
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Chemistry for Environmental Engineering and Science" by Clair N. Sawyer	No
Recommended Texts	"Chemistry of the Environment" by Thomas G. Spiro.	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	**Fluid Mechanics**			**Module Delivery**	
Module Type	**Core**			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CE222**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Civil Eng. Dept.		**College**	Iraq University College	
Module Leader	Dr. Eng. Abdul-Khaliq Mahmud HUSSAIN		**e-mail**	dr.eng.abdulkhaliq@gmail.com	
Module Leader's Acad. Title	Associated Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Abdul-Khaliq Mahmud HUSSAIN		**e-mail**	dr.eng.abdulkhaliq@gmail.com	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CE112 Engineering Mechanics	**Semester**	2
Co-requisites module	CE422 Sanitary Engineering	**Semester**	8

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- To develop problem solving skills and understanding of Fluid Mechanics in civil engineering. 2- This course deals with the basic concepts of Fluid Mechanics. 3- This is the basic subject for all electrical and electronic circuits. 4- 4- To understand viscous fluid flow problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- To understand general principles of fluid mechanics 2- To understand incompressible and compressible flow 3- To understand flow through pipes and open channel
Indicative Contents المحتويات الإرشادية	This module covers a wide range of topics of fluid mechanics in order to offer basic knowledge and foundations applicable to various civil engineering problems. This module introduces fundamental of conservation (mass, momentum and energy) laws of fluid flow, potential (ideal) flow, inviscid compressible flow and viscous flow. This module is also complemented by lab classes and tutorials

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, and interactive tutorials.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)		
	Assignments	2	10% (10)		
	Projects / Lab.	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	Midterm Exam	2 hr	10% (10)		
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Fluid Properties, Dimensions and Units
Week 2	Fluid pressure and its measurements
Week 3	Hydrostatic forces on surfaces: plane Surfaces
Week 4	Hydrostatic forces on surfaces: Non plane Surfaces
Week 5	Buoyancy and floatation
Week 6	Kinematics and dynamics of fluid flow, Bernoulli's equation
Week 7	Fluids Subjected to constant acceleration
Week 8	Applications of Bernoulli's equation
Week 9	Discharge measurements
Week 10	Momentum equation
Week 11	Laminar and turbulent flow
Week 12	Flow through pipes, Major and minor head losses
Week 13	Flow through pipes, Major and minor head losses
Week 14	Open channel flow
Week 15	Open channel flow
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Some Physical Properties of Fluids
Week 2	Fluid Pressure at a Point
Week 3	Simple Manometers, Differential Manometers
Week 4	Hydrostatic Forces on Submerged Surfaces
Week 5	Impulse Momentum Equation
Week 6	Types of Resistances and Losses of Energy in Pipes
Week 7	Flow Measuring Devices

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fluid Mechanics, Streeter	Yes
Recommended Texts	Fluid Mechanics, White, F.M., 2016	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	**Concrete Technology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CE214**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level		2	**Semester of Delivery**		3
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. **Understanding Concrete Composition:** Students should be able to comprehend the basic components of concrete, including cement, aggregates, water, and admixtures. They should understand how these materials interact to form a cohesive and durable construction material. 2. **Mix Design and Proportioning:** The course should teach students how to design concrete mixes to meet specific strength, durability, and workability requirements. This includes learning about different mix design methods and tools. 3. **Concrete Production and Testing:** Students should be capable of overseeing the production of concrete, including batching, mixing, and curing, and be able to conduct various tests to assess the quality of the concrete. This includes understanding the importance of quality control in construction projects. 4. **Properties and Behavior of Concrete:** The course should cover the physical and mechanical properties of concrete, including strength, durability, shrinkage, and creep. Students should be able to predict how concrete will behave under different conditions and loads.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. **Mastery of Concrete Basics**: Understand the fundamental components and properties of concrete. 2. **Mix Design Proficiency**: Develop the ability to design concrete mixes to meet specific project requirements. 3. **Quality Assurance:** Implement quality control measures during concrete production and testing. 4. **Strength Prediction:** Predict concrete strength and behavior under different conditions. 5. **Reinforced Concrete Competence**: If applicable, design and analyze reinforced concrete structural elements. 6. **Worksite Skills**: Demonstrate hands-on knowledge of concrete construction practices and techniques. 7. **Durable Concrete:** Learn methods to enhance concrete durability and resistance to environmental factors. 8. **Safety Awareness:** Understand safety protocols and best practices in handling and working with concrete. 9. **Sustainability Awareness:** Explore sustainable practices and materials in concrete technology. 10. **Problem Solving:** Develop problem-solving skills to address challenges in concrete-related projects.

Indicative Contents المحتويات الإرشادية	1. **Introduction to Concrete:** o Historical development of concrete. o Basic composition and properties of concrete. o Importance of concrete in construction. 2. **Materials Used in Concrete:** o Types of cement and their properties. o Aggregates: natural and artificial, grading, and characteristics. o Water-cement ratio and its significance. o Chemical and mineral admixtures. 3. **Concrete Mix Design:** o Principles and methods of mix design. o Proportioning of ingredients for desired properties. o Factors affecting workability and strength. 4. **Concrete Production:** o Batching, mixing, and transporting of concrete. o Quality control during production. o Handling and placing of concrete on-site. 5. **Fresh and Hardened Concrete Properties:** o Workability, consistency, and slump. o Setting time and curing requirements. o Strength development and testing methods. 6. **Durability and Serviceability:** o Factors affecting concrete durability. o Measures to enhance durability. o Understanding shrinkage, cracking, and creep. 7. **Concrete Testing and Quality Assurance:** o Laboratory and field-testing methods. o Interpretation of test results. o Quality control measures. 8. **Construction Practices:** o Formwork design and construction. o Concrete placement, compaction, and finishing techniques. o Curing methods and importance. 9. **Sustainability in Concrete Technology:** o Sustainable materials and practices. o Recycling and minimizing environmental impact. o Green building certifications. 10. **Safety Considerations:** o Safety protocols for handling and working with concrete. o Hazards and risk mitigation on construction sites.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures convey theoretical concepts, while hands-on lab sessions provide practical experience. Case studies illustrate real-world applications. Group discussions encourage critical thinking and problem-solving. Site visits offer insight into construction practices. Assignments and assessments evaluate comprehension. Continuous engagement with both theory and practice enhances student understanding and readiness for the construction industry.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Concrete
Week 2	Concrete Materials
Week 3	Cement
Week 4	Aggregate
Week 5	Water and admixture
Week 6	Mix Design Principles
Week 7	Concrete Production
Week 8	Fresh Properties
Week 9	Hardened Properties
Week 10	Durability & Serviceability
Week 11	Testing & Quality Control
Week 12	Sustainability & Safety
Week 13	Case Studies & Applications
Week 14	Emerging Trends & Projects
Week 15	Review & Assessments
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Lab Equipment
Week 2	Concrete Mixing and Batching
Week 3	Workability Testing
Week 4	Strength Testing
Week 5	Fresh Concrete Properties
Week 6	Hardened Concrete Properties
Week 7	Quality Control Procedures

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Concrete technology by SachinRohilla& Vipin Rohilla 1st edition	Yes
Recommended Texts	Concrete technology by B.L. Gupta & Amit Gupta Edition 2012	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	**Applied mathematics**			**Module Delivery**	
Module Type	**Basic**			x **Theory** x **Lecture** ☐ **Lab** x **Tutorial** ☐ **Practical** x **Seminar**	
Module Code	**E211**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Assist. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics	**Semester**	E111
Co-requisites module	Engineering & Numerical Analysis	**Semester**	CE311

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The course aims to; 1- Presenting polar coordinates and their applications in engineering 2- Presenting vectors and their applications in engineering 3- Presenting series and their applications in engineering 4- Presenting partial derivatives and their applications in engineering 5- Presenting multiple integral and their applications in engineering 6- Presenting complex numbers and their applications in engineering
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge and Understanding 1- Understanding polar coordinates and their relation to Cartesian coordinates and their applications. 2- Studying vectors and use them to study the analytic geometry of space with their important applications in engineering. 3- Studying different types of series and their applications in solving different engineering and mathematical problems 4- Using partial differentiation in deriving different surface equations, rate of change, optimization problem and estimation of change. 5- Studying and using multiple integral and their applications in civil engineering such as determining areas, volumes, center of masses and moments of inertia. 6- Studying complex numbers and their relations in solving different mathematical problems.
Indicative Contents المحتويات الإرشادية	– Graphing in Polar coordinates, calculating areas and lengths of curves using polar coordinates. - Study the analytic geometry of space using vectors. Vectors provide simple ways to define equations for lines, planes, curves, and surfaces in space with their many important applications in science, engineering. - study partial derivatives for the functions of two or multiple variables, chain rules, directional derivatives and critical points. - Study the multiple integrals in Cartesian and polar coordinates and area, volume, centroid and moment of inertia calculations using multiple integrals.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Scientific and research skills are developed through teaching and learning activities. Analysis and problem solving skills are further developed by means of a set of problems prepared by the lecturers in small study groups and all assignments and report work submitted is evaluated and responded to.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO # 1, 2, 4, 5
	Assignments	2	10% (10)	4, 9	LO # 1, 2, 4, 5
	Report	1	10% (10)	13	LO # 3, 6
Summative assessment	**Midterm Exam**	2 hr	20% (20)	7	LO # 1,2,3
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Definition of Polar Coordinates, Polar Equations and Graphs, Relating Polar and Cartesian Coordinates, Graphing Polar Coordinate Equations
Week 2	Areas and Lengths in Polar Coordinates
Week 3	Vectors and the Geometry of Space, Component Form and Vector Algebra Operations
Week 4	Unit Vectors, Midpoint of a Line Segment, Navigation, forces action on a single object
Week 5	The Dot Product, Angle Between Vectors, orthogonal Vectors, work and Vector Projections
Week 6	The Cross Product, Calculating the Cross Product as a determinant, Area of a Parallelogram and Torque, Lines and Planes in Space
Week 7	Infinite Sequences and Series, Infinite Series, Taylor and Maclaurin Series,
Week 8	Power Series, The Binomial Series and Applications of Taylor Series
Week 9	Partial Derivatives, Limits and Continuity in Higher Dimensions, Partial Derivatives of a Function of Two and Three Variables Second-Order and higher Partial Derivatives.
Week 10	The Chain Rule, Directional Derivatives and Gradient Vectors, Tangent Planes and Differentials, Estimating Change in a Specific Direction
Week 11	Extreme Values and Saddle Points, optimization
Week 12	Double Integrals in Cartesian and Polar Form, Area by Double Integration
Week 13	Triple Integrals, Area, volume, centroid and moment of inertia
Week 14	Triple Integrals in Cylindrical and Spherical Coordinates
Week 15	Complex Numbers, Argand Diagrams, Euler's Formula, Operations on complex number
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Thomas' Calculus, George B. Thomas	Yes
Recommended Texts	Calculus , STANLEY I. CROSSMAN	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	**Computer Programing**			**Module Delivery**	
Module Type	**Support**			☐ **Theory** ✓ ☐ **Lecture** ✓ ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ✓ ☐ **Seminar**	
Module Code	**CE215**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	none		**e-mail**	None	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	CE215 Computer applications	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• To Develop foundational programming skills • Enhance problem-solving abilities. • Foster interdisciplinary collaboration: The module encourages collaboration between civil engineers and computer scientists, promoting the integration of computational techniques into civil engineering practices to improve efficiency, accuracy, and innovation in the field.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Knowledge of computer basics • Building an integrated algorithm for any program • Draw a flowchart for any program • Using Word and creating a Word file • Drawing charts using Excel • Perform all calculations and obtain results using Excel • Preparing a presentation using PowerPoint
Indicative Contents المحتويات الإرشادية	1. Proficiency in programming: Students will demonstrate the ability to write, debug, and modify code in relevant programming languages commonly used in civil engineering, such as Python or MATLAB. 2. Problem-solving skills: Learners will develop the capacity to apply programming concepts to analyze and solve civil engineering challenges, ranging from structural design optimization to traffic flow simulations. 3. Data analysis and visualization: Students will acquire the skills to process and visualize engineering data using programming tools, enabling them to make informed decisions and communicate results effectively. 4. Interdisciplinary collaboration: The module will encourage students to collaborate across disciplines, fostering the integration of computational methods into civil engineering practices for innovative solutions. 5. Automation and efficiency: Graduates will be able to automate repetitive tasks, improving efficiency in engineering workflows through the application of programming techniques and scripts. 6. Critical thinking and adaptability: The module will promote critical thinking and adaptability in approaching complex engineering problems, equipping students with valuable problem-solving skills for their future careers.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Learning and teaching strategies for this module involve a combination of lectures, hands-on coding exercises, group projects, and case studies. Students will engage in practical programming tasks, collaborate with peers, and receive guidance from instructors to reinforce theoretical knowledge and develop practical skills essential for computer programming in civil engineering.

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	3
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)	5,10	
	Assignments	2	10% (10)	2,12	
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	
	Final Exam	2hr	50% (50)	16	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Programming Concepts
Week 2	Basics of Python Programming
Week 3	Data Types and Variables
Week 4	Control Structures (Conditionals and Loops)
Week 5	Functions and Modules
Week 6	File Handling and Input/Output
Week 7	Data Analysis and Visualization
Week 8	Error Handling and Debugging
Week 9	Interdisciplinary Applications
Week 10	Midterm Assessment
Week 11	Automation in Civil Engineering
Week 12	Case Studies and Project Work
Week 13	Project Presentation and Evaluation
Week 14	Final Review and Assessment
Week 15	Seminar
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Setting Up Development Environment
Week 2	Python Fundamentals and Syntax
Week 3	Variables and Data Types
Week 4	Conditional Statements
Week 5	Loops and Iteration
Week 6	Functions and Modules
Week 7	File Input and Output

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	"Programming for Civil Engineers: A Practical Guide" by S. Rajasekaran and S. G. Bhuvaneshwari: This book focuses on applying programming concepts to civil engineering problems and provides relevant examples and exercises.	No
Recommended Texts		
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Human rights and democracy**			**Module Delivery**	
Module Type	**Support**			☐ **Theory** ✓ ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ✓ ☐ **Seminar**	
Module Code	**E214**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	none		**e-mail**	None	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• Understanding Human Rights: To familiarize students with the concept of human rights, their historical development, and the various international human rights instruments and treaties. • Legal Framework: To explore the legal and ethical foundations of human rights, including the Universal Declaration of Human Rights, regional conventions, and domestic laws. • Rights and Freedoms: To examine specific human rights and freedoms, such as the right to life, liberty, equality, non-discrimination, and freedom of expression, and to understand their significance in society. • Democracy and Governance: To introduce the principles of democracy, including its core elements like free and fair elections, the rule of law, accountability, and transparency.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Foundations of Human Rights • Principles of Democracy • International Human Rights Law • Democracy and Governance Structures • Comparative Democracy Analysis • Human Rights Violations and Consequences
Indicative Contents المحتويات الإرشادية	1. The Concept of Human Rights: • Historical development of human rights. • Core principles and values underpinning human rights. • International human rights treaties and conventions. 2. Democratic Principles and Governance: • Essentials of democracy, including free elections and the rule of law. • Types of democratic systems and governance structures. • Mechanisms for ensuring accountability and transparency. 3. Human Rights Violations and Cases: • Types of human rights violations, e.g., discrimination, torture, and censorship. • Real-world case studies of human rights abuses. • Consequences of human rights violations on individuals and societies. 4. Advocacy and Practical Skills: • Advocacy strategies for promoting human rights and democracy. • Research methods for analyzing human rights issues. • Communication skills for raising awareness and driving change.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم
Utilize a combination of lectures, group discussions, case studies, and simulations to foster critical thinking, debate, and active engagement. Encourage self-directed learning through research projects, and use guest speakers or field visits to provide real-world perspectives.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	18	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Human Rights and Democracy
Week 2	Historical Development of Human Rights
Week 3	International Human Rights Instruments
Week 4	Principles of Democracy
Week 5	Democratic Governance Structures
Week 6	Comparative Analysis of Democracies
Week 7	Human Rights Violations and Case Studies
Week 8	Advocacy Skills and Strategies
Week 9	Research Methods in Human Rights
Week 10	Policy Evaluation and Recommendations
Week 11	Ethical Dilemmas in Human Rights and Democracy
Week 12	Cultural Context in Human Rights
Week 13	Teamwork and Collaboration
Week 14	Effective Communication Skills
Week 15	Problem Solving in HR and Democracy
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Title: "Introduction to Human Rights and Democracy" Author: John A. Smith	No
Recommended Texts		
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Strength of materials			**Module Delivery**	
Module Type	C			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CE212				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Civil Engineering		**College**	IRAQ University College	
Module Leader	Dr Kamil Alshammaa		**e-mail**	Kamil.alshamma@yahoo.com	
Module Leader's Acad. Title			**Module Leader's Qualification**	Doctorate	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CE112 Engineering mechanics	**Semester**	2
Co-requisites module	CE312 Theory of Structure	**Semester**	5

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. LEARNING how to solve equilibrium equations to find the reactions 2. HOW to find the bending moment and the shear force ar a given section 3. TO DRAW the (SF and BM) diagram 4. To find the second moment of area in order to calculate the stresses in the beam 5. To calculate the extension (or compression - in a beam under several loadings 6. To calculate the Deflection of beams by integration methods 7. To calculate the failure that can be introduced in various loading conditions
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. TO LEARN and be able to draw the SF and BM diagrams 2. To be able to calculate the stresses in beams from both: a- The SF and BM diagrams b- And also from the equation relating the stress to BM 3. To be able to calculate the extension in beams 4. To be able to calculate the deflection of beams using integration 5. To realize the failure in beams and to choose the correct stress which occurs first
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Many different types of methods to get the information assimilated . For example the use of solving many examples which were to solve different Questions. 2. It was necessary to calculate the moment of inertia For the beam cross section in order to calculate the stress in the beam 3. The failure which can occur in beams due to many reasons was evaluated for the beam and the least value taken

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20		
	Assignments	2	10		
	Projects / Lab.				
	Report	1	10		
Summative assessment	**Midterm Exam**	2hr	10% (10)		
	Final Exam	3hr	50% (50)	16	all
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Vector addition , subtraction , Finding the resultant of many forces
Week 2	EXAMPLES
Week 3	Finding the resultant of a coplanar system of forces with many examples
Week 4	Calculation of BM at various points and Calculating SF too
Week 5	Applying the knowledge to draw the Full diag. of BM and SF
Week 6	Doing the second moment of area And applying the formula to get the stress in the beam
Week 7	Calculating the extension in beams due to many different types of loading
Week 8	Solving many problems for proving the above
Week 9	Revision of the previous points on many examples
Week 10	Beams may fail in tension or shear . Examples
Week 11	Calculating of the failure in each case
Week 12	Choosing the failure stress that will be necessary
Week 13	Calculating of the deflection of the beam by the integration
Week 14	Applying the end conditions due to the present conditions
Week 15	**Examples to show the application of the above**
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Bear and Johnston , Materials Mechanics	no
Recommended Texts		
Websites		

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Survey**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical**	
Module Code	**CE211**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CE111 Engineering Drawing	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aim of this Module is to provide the student with a deep understanding of surveying and construction activities; practical application of topographic surveying skills, an awareness of the preliminary considerations involved in construction developments and a knowledge of the materials and procedures employed in construction of small commercial/industrial building works.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Apply the basic surveying concepts, principles, and theories on distance and angular measurements as well as area computation. 2. Solve distances, elevations, and areas from a provided set of survey data. 3. Apply the basic surveying concepts, principles, and theories on determining horizontal and vertical distances using stadia. 4. Compute the missing data from incomplete traverse data. 5. Acquire a working knowledge of the design and layout of horizontal or vertical curves in highways or railways. 6. Determine and use the appropriate methodology in calculating earthworks in various civil engineering constructions.
Indicative Contents المحتويات الإرشادية	LESSON 1: Introduction to Surveying a. Surveying Concepts b. Types of Surveys c. Importance of Surveying d. Surveying Equipment and Accessories e. Measurement f. Sources of Errors g. Errors and Mistakes h. Accuracy and Precision Distance Measurement a. Measurement of Horizontal Distance - Pacing - Taping - Tachymetry - Graphical & Mathematical Method - Mechanical Devices - Photogrammetry b. Taping Over Level Ground Taping Along Sloping Ground LESSON 3: Distance Corrections a. Types of Correction b. Incorrect Tape Length c. Temperature Variations d. Slope Corrections e. Sag and Tension Corrections f. Combined Taping Corrections g. Errors in Taping h. Taping Precision LESSON 4: Leveling Methods a. Importance of Leveling b. Reference Elevations or Datums c. Types of Level d. Methods of Leveling e. Differential Leveling f. Leveling Errors g. Profile Leveling h. Profiles and Cross Sections LESSON 5: Angles and Directions Measurements a. Meridians b. Azimuth c. Bearings d. The Compass e. Local Attraction f. Traverse Angle Definitions g. Traverse Computations h. Transits and Theodolites i. Introduction to Total Stations j. Advantages and Disadvantages of Total Stations k. Surveying with Total Stations l. Measuring Horizontal Angles m. Closing the Horizon n. Measuring Zenith Angles CLO 1, 2, & 3 Synchronous • Lesson 5: Angles and Direction Measurement Sample Problems • Discussion of QUIZ # 1 • Asynchronous • Lesson 5: Angles and Direction Measurement Asynchronous Seatwork # 4 Assignment # 4 5th

	Traverse Adjustment and Area Computation a. Methods of Calculating Areas b. Balancing Angles c. Latitudes and Departures d. Error of Closure e. Balancing Latitudes and Departures f. Double Meridian Distances g. Double Parallel Distances h. Rectangular Coordinates i. Areas Computed by Coordinates j. Areas Within Irregular Boundaries LESSON 8: Topographic Survey a. Introduction to Topographic Survey b. Contours c. Plotting of Contour Characteristics d. Map Symbols e. Transit-Stadia Method of Mapping f. Plane Table Surveys g. Profiles from Contour Maps h. The Stadia Theory a. Measurement by Stadia for Horizontal distances b. Measurement by Stadia for inclined Distance c. Sources of Error in stadia work. LESSON 9: Horizontal curves a. Simple Curve b. Compound Curve c. Reverse Curve Spiral Curve Lesson 10: Vertical Curves a. Symmetrical Parabolic Curve b. Unsymmetrical Parabolic Curve

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Problem set assignments are due at the beginning of class. Homework can be turned in early if a student expects to be absent. • Guidelines for homework: a. All solutions will be submitted on 8 ½" x 11" paper. b. Solutions will be presented on one side of each sheet only. c. The first page will contain the following in the upper left margin: - Student's name - Student number - Course code and Course Title - Indicate the Problem set d. The final answer must be boxed together with the correct units. e. Clarity and neatness are vital. Points may be taken off for sloppiness.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	3&9	LO 1&2&3
	Assignments	2	10% (10)	5&13	LO 2&5
	Projects / Lab.	1	10% (10)	12	LO 6
	Report	1	10% (10)	10	LO 5 & 4
Summative assessment	Midterm Exam	2 hr	10% (10)	15	All
	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 Surveying Distance Measurement
Week 2	Distance Corrections
Week 3	Leveling Methods
Week 4	Angles and Directions Measurements
Week 5	Traverse Adjustment and Area Computation
Week 6	Topographic Survey
Week 7	Topographic Survey
Week 8	Horizontal curves
Week 9	Vertical Curves
Week 10	Earthwork Operations & Mass Diagram
Week 11	Earthwork Operations & Mass Diagram
Week 12	Global Positioning System
Week 13	Satellite survey
Week 14	GIS
Week 15	GIS
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Tape measurement
Week 2	Tape measurement
Week 3	Tape measurement
Week 4	Leveling
Week 5	Leveling
Week 6	Leveling
Week 7	Theodolite
Week 8	Theodolite
Week 9	Total Station
Week 10	Total Station
Week 11	Total Station
Week 12	Total Station
Week 13	Total Station
Week 14	Total Station
Week 15	Total Station

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		no
Recommended Texts	1. Surveying: Theory and Practice by James M. Anderson and Edward M. Mikhail, (7th Edition), 2002 2. Kavanagh, Barry F., Surveying: Principles and Applications (9th Edition), 2014 3. Kavanagh, Barry F., Surveying with Construction Applications (8th Edition), 2015 4. Ghilani, C.D., and Wolf, P.R., Elementary Surveying: An Introduction to Geomatics (13th Edition), 2011 5. Schofield W. and M. Breach, Engineering Surveying, (6th Edition), 2007 6. La Putt, J.P., Elementary Surveying (3rd Edition) 2013 Reprint 7. La Putt, J.P., Higher Surveying (2nd Edition) 2013 Reprint	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	**Building construction and Civil drawings**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CE221**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**CE111 Engineering Drawing**	**Semester**	**1**
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand building construction principles, materials, and techniques. 2. Read and interpret various civil drawings, including architectural plans and structural layouts. 3. Familiarize with local building codes, regulations, and safety practices. 4. Learn about sustainable building practices and green construction techniques. 5. Gain knowledge of construction project management and documentation. 6. Develop practical skills through hands-on experience with CAD software and construction projects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify and describe different building construction principles, materials, and techniques used in the construction industry. 2. Interpret and analyze various types of civil drawings, including architectural plans, structural layouts, and site plans, to understand the design and construction requirements of a project. 3. Apply knowledge of local building codes, regulations, and safety practices to ensure compliance and promote safe construction practices on building sites. 4. Evaluate and recommend sustainable building practices and green construction techniques to minimize environmental impact and promote energy efficiency in construction projects. 5. Demonstrate proficiency in using computer-aided design (CAD) software to create and modify civil drawings accurately and efficiently. 6. Implement effective construction project management techniques, including project planning, scheduling, budgeting, and resource management, to facilitate successful project execution. 7. Collaborate and communicate effectively with architects, engineers, contractors, and other stakeholders involved in the construction process to achieve project objectives. 8. Apply surveying and site layout techniques to ensure accurate positioning and measurements during the construction phase. 9. Analyze and select appropriate construction materials based on their properties, uses, and applications in different building components. 10. Implement quality control measures to ensure the durability, safety, and integrity of constructed buildings. 11. Engage in practical hands-on experiences, such as participating in construction projects or simulations, to apply theoretical knowledge in real-world scenarios.

Indicative Contents المحتويات الإرشادية	The indicative contents for a course on building construction and civil drawings could include the following topics: 1. Introduction to Building Construction o Building construction principles and methods o Types of construction projects (residential, commercial, industrial) o Construction industry roles and responsibilities 2. Building Materials and Techniques o Properties and applications of construction materials (concrete, steel, wood, etc.) o Masonry construction techniques o Framing and structural systems 3. Civil Drawings and Documentation o Reading and interpreting architectural plans o Understanding structural drawings and engineering details o Site plans and landscaping drawings 4. Building Codes and Regulations o Local building codes and regulations o Building permits and approvals o Fire and safety codes in construction 5. Construction Site Layout and Surveying o Site investigation and preparation o Basic surveying techniques and equipment o Setting out building foundations 6. Sustainable Building Practices o Green building concepts and certification systems (LEED, BREEAM, etc.) o Energy-efficient design and construction o Recycling and waste reduction in construction 7. Computer-Aided Design (CAD) for Civil Drawings o Introduction to CAD software for civil engineering and architectural drawings o Creating and editing 2D and 3D drawings o Annotating and dimensioning drawings 8. Structural Systems and Design o Introduction to structural engineering principles o Load-bearing capacity and safety factors o Structural design considerations for different building types 9. Construction Project Management o Project planning and scheduling o Budgeting and cost estimation o Resource allocation and procurement 10. Construction Safety and Quality Control o Construction site safety practices o Quality assurance and quality control in construction o Inspection and testing of materials

	11. Building Services and Utilities o Plumbing and drainage systems o Electrical and lighting layouts o HVAC (Heating, Ventilation, and Air Conditioning) systems 12. Communication and Collaboration in Construction o Effective communication among construction team members o Coordination between architects, engineers, and contractors o Client and stakeholder communication 13. Case Studies and Real-World Projects o Analysis of successful construction projects o Challenges and lessons learned from construction failures o Group projects involving real-world scenarios and civil drawing exercises

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Interactive Lectures and Multimedia Presentations: Engage students through interactive lectures and multimedia presentations to introduce key concepts and techniques. 2. Hands-on Workshops and CAD Practice: Conduct hands-on workshops for practical experience in reading drawings and using CAD software. 3. Site Visits and Case Studies: Arrange site visits and present case studies to provide real-world insights into construction projects. 4. Peer Learning and Group Discussions: Foster peer learning and group discussions for collaborative problem-solving. 5. Formative and Summative Assessments: Use formative assessments for timely feedback and summative assessments to evaluate overall proficiency. These strategies help promote active learning and provide students with practical skills and real-life perspectives in the field of building construction and civil drawings.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Building Construction
Week 2	Brick
Week 3	Concrete
Week 4	Arches
Week 5	Cavity Wall
Week 6	Stairs
Week 7	Fire Resistive Construction
Week 8	Plastering
Week 9	Damp prevention
Week 10	Types of doors and windows
Week 11	Painting and decoration
Week 12	Glazing
Week 13	Repair of Building
Week 14	Stone and Timber
Week 15	Foundation
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Agilent VEE and PSPICE
Week 2	Lab 2: Thévenin's / Norton's Theorem and Kirchhoff's Laws
Week 3	Lab 3: First-Order Transient Responses
Week 4	Lab 4: Second-Order Transient Responses
Week 5	Lab 5: Frequency Response of RC Circuits
Week 6	Lab 6: Frequency Response of RLC Circuits
Week 7	Lab 7: Filters

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	A Text book of Building Construction, S.P. Arora and S.P. Bindra, Dhanpat Rai & Sons.	Yes
Recommended Texts	A Text Book of Building Materials, C.J. Kulkarrn	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	**Engineering Statistics**			**Module Delivery**	
Module Type	**Supportive**			☐ **Theory** ✓ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CE213**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The module aims to present the basic of engineering statistics by analyzing, organizing and describing data in tables and drawings, knowing the measures of dispersion and central tendency, in addition to knowing the theory of probability and inference from the data to make decisions and linking them to engineering reality.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A- Knowledge and Understanding 1- Understand the importance of statistics and its divisions. 2- Learn how to show and represent statistical data with tables or graphics. 3- Identify the most important measures of central tendency and dispersion of data. 4- Learn about probability theory and its different distributions. 5- Identifying the design of samples, their estimation, and knowledge of their properties. B. Subject-specific skills 1- Analyze, organize, and describe data in tables and/or curves. 2- Describe the averages of the data and methods of measuring their dispersion. 3- Engineering inference from the statistical data to take the appropriate decision. 4- Linking information to engineering reality.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Weekly homework and daily and weekly quizzes. Giving assignments and activities in the classroom. As well as guiding students to the important scientific sources and taking some exercises to practice on them.

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	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	10% (10)		
	Assignments	2	10% (10)		
	Projects / Lab.	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	**Midterm Exam**	2 hr	10% (10)		
	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 ENGINEERING STATISTICS (Brief definition in statistics)
Week 2	PRESENTATION OF STATISTICS DATA cont. (Frequency distributions, Frequency distributions table)
Week 3	PRESENTATION OF STATISTICS DATA (Cumulative frequency distribution, Graphical representation of data)

Week 4	Graphical representation of data (Cumulative frequency curves, Histogram, Frequency polygon)
Week 5	MEASURES OF CENTRAL LOCATION (Measures of center, four types)
Week 6	MEASURES OF DISPERSION, THE PROBABILITY (Measures of dispersion, four types, Probability theory)
Week 7	THE PROBABILITY cont. (Combinations of Three or More Events)
Week 8	THE PROBABILITY cont. (Probability theory rules, Conditional Probability, Bayes' theorems)
Week 9	Geometric Probability (Geometric Probability examples)
Week 10	PROBABILITY DISTRIBUTION (Discrete probability distribution, Discrete Uniform Distribution)
Week 11	PROBABILITY DISTRIBUTION, cont. (Geometric Distribution, Negative binomial Distribution, Binomial Distribution)
Week 12	Continuous Probability Distributions, Continuous Uniform Distributions, Normal Distributions, Exponential Distribution)
Week 13	SAMPLING DISTRIBUTION (Sampling Distribution of the Sample Mean, Central Limit Theorem, applications)
Week 14	THE EXPECTATION (Expectation properties and Moments)
Week 15	THE ESTIMATION (point estimator, interval estimator)
Week 16	**Preparatory week before the final Exam**

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

Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Statistics with engineering applications Entry to statistics	--
Recommended Texts	Fundamentals of Behavioral Statistics ,1988	--
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	**The crimes of the defunct Ba'ath party**			**Module Delivery**	
Module Type	**Support**			☐ **Theory** ✓ ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ✓ ☐ **Seminar**	
Module Code	**E215**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	none		**e-mail**	None	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• Historical Understanding: To provide students with a comprehensive historical understanding of the rise, evolution, and eventual fall of the Ba'ath Party in Iraq. • Political Ideology and Structure: To explore the political ideology, structure, and principles of the Ba'ath Party, including its origins and key leaders. • Crimes and Human Rights Violations: To examine and analyze the various crimes and human rights violations committed by the Ba'ath Party during its time in power, including but not limited to political repression, torture, and mass killings. • Regional Impact: To assess the regional impact of the Ba'ath Party, including its role in conflicts and relations with neighboring countries.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Historical Context Comprehension • Political Ideology Analysis • Human Rights Awareness • Comparative Analysis Skills • Transitional Justice Understanding • Research and Communication Proficiency
Indicative Contents المحتويات الإرشادية	1. Ba'ath Party Origins and Evolution 2. Crimes and Human Rights Violations 3. International Response and Conflicts 4. Post-Ba'athist Iraq and Transitional Justice

Learning and Teaching Strategies استراتيجيات التعلم والتعليم
Learning and teaching strategies include lectures, group discussions, case studies, guest speakers, multimedia presentations, and interactive assignments. These methods engage students, foster critical thinking, and promote active participation in understanding the crimes of the Ba'ath Party.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	18	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5,10	
	Assignments	2	10% (10)	2,12	
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	
Summative assessment	Midterm Exam	2 hr	10% (10)	7	
	Final Exam	2hr	50% (50)	16	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to the Ba'ath Party
Week 2	Historical Origins and Ideology
Week 3	Ba'ath Party in Power
Week 4	Crimes and Human Rights Violations
Week 5	International Response and Conflicts
Week 6	Transitional Justice and Trials
Week 7	Post-Ba'athist Iraq
Week 8	Comparative Analysis
Week 9	Policy Implications
Week 10	Student Presentations
Week 11	Ethical Considerations
Week 12	Reflection and Conclusion
Week 13	
Week 14	
Week 15	
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		No
Recommended Texts		
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Theory of Structure**			**Module Delivery**	
Module Type	**Core**			✓ **Theory** ✓ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CE312**				
ECTS Credits	**10**				
SWL (hr/sem)	**250**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Mechanics Strength of Materials	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop an understanding of the basic principles of structural analysis and be able to explain them. 2. To determine and analyze models of applied loads on structures. 3. To develop and utilize influence lines of structures. 4. To utilize various methods of analysis of beams, trusses, and frames to determine the response of both determinate and indeterminate structures. 5. To understand the role of structural analysis within the context of engineering design and decision making.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Ability to apply knowledge of basic mathematics through differential equations, science, and engineering to solving engineering problems. 2. Ability to formulate and solve civil engineering problems. 3. Understanding of professional and ethical responsibility. 4. Recognition of the need for, and an ability to engage in, life-long learning. 5. Ability to use modern tools, techniques, and computation methods necessary for civil engineering practice.
Indicative Contents المحتويات الإرشادية	<u>Part I: Statically Determinate Structures</u> Types of structural elements, Types of structures, Types of loads, Types of supports, Equations of equilibrium, Equations of condition, Determinancy and stability. Internal loadings developed in structural members, sign convention, Shear force and bending moment diagrams for a beam, Relationships between load, shear force and bending moment, Moment diagrams by method of superposition, Shear and moment diagrams for a frame. Determinancy and stability of trusses, The method of joints, The method of sections. Influence lines for statically determinate structures, Influence lines for beams, Relationships of influence lines and structural loading, Influence lines for trusses, Moving loads on beams, Absolute maximum moment in a beam. Approximate analysis of statically indeterminate structures, Indeterminate trusses, Vertical loads on building frames, Lateral loads on building frames: portal method. Deflection of a beam, Significance of beam deflections, Double integration method, Singularity function method, Moment-area method. <u>Part II: Statically Indeterminate Structures</u> Force methods, Method of consistent deformations, Basic procedure, Primary structure, Redundant reaction components. Displacement methods, The slope-deflection method, Derivation of the slope-deflection equations, Application of the slope-deflection method to the analysis of statically indeterminate beams, Analysis of rigid frames without joint translation. The moment distribution method, General description of the moment distribution method, Distribution factor, Procedure, Modified stiffness factor for hinged far end, Support settlement, Application of moment distribution to frames without sidesway. Energy methods, Strain energy in an elastic system: axial loading, flexural loading, Castigliano's theorem method, Joint displacement in trusses, Application of Castigliano's theorem to statically indeterminate structures: beams, frames.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main objective is to insure that students understand the basic concepts and developing their problem solving strategies. Most engineering students have difficulty in application of the fundamental concepts they have learned to specific cases. Therefore, the lecture material is incorporated with as many possible illustrative examples in order to facilitate the application of principles to actual problems. Importance is placed on the significance of the results obtained for physical problems, as it is often the case nowadays with the development of engineering software, that the student is concerned with merely "solving the problem" and obtaining results without their interpretation physically.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	122	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	128	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	8.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5,10	1,2
	Assignments	2	10% (10)	2,12	1,2
	Projects / Lab.	1	10% (10)	6	1,2,3,4,5
	Report	1	10% (10)	13	1,2,3,4,5
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	1,2,3,4,5
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction
Week 2	Internal Loadings Developed in Structural Members
Week 3	Analysis of Statically Determinate Trusses
Week 4	Influence Lines
Week 5	Influence Lines
Week 6	Approximate Analysis of Statically Indeterminate Structures
Week 7	Deflections
Week 8	Force Methods
Week 9	Force Methods
Week 10	Displacement Methods: Slope Deflection
Week 11	Displacement Methods: Moment Distribution
Week 12	Displacement Methods: Moment Distribution
Week 13	Energy Methods
Week 14	Energy Methods
Week 15	Preparatory week
Week 16	Final Exam

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

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Elementary Theory of Structures", Yan-yu Hsieh, Prentice-Hall, 1982.	Yes
Recommended Texts	"Structural Analysis", Russel C. Hibbeler, 9th ed., Pearson Education, 2014.	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	**Soil mechanics**			**Module Delivery**	
Module Type	**Core**			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CE316				
ECTS Credits	9				
SWL (hr/sem)	**225**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr. Naji Hkeralla Mustafa		**e-mail**	dr.naji@Iraquniversity.net	
Module Leader's Acad. Title	Asst. Prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fluid mechanics, engineering mechanics	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aim of this module is to learn the students how to; 1. Compute the soil stability under the effect of ground water 2. Classify the soil 3. Compute the factor of safety against the piping , boiling and heaving 4. Compute the percent of compaction 5. Compute the max. density and the optimum moisture content 6. Compute the increasing the stress due the surface load 7. Compute the amount the final settlement due to the surface load 8. Compute the settlement at a finite time 9. Compute the shear strength of soil 10. Compute the factor of safety against the failure at any plane
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of this module, students will be able to; 1. Compute the soil stability under the effect of ground water 2. Classify the soil 3. Compute the factor of safety against the piping , boiling and heaving 4. Compute the percent of compaction 5. Compute the max. density and the optimum moisture content 6. Compute the increasing the stress due the surface load 7. Compute the amount the final settlement due to the surface load 8. Compute the settlement at a finite time 9. Compute the shear strength of soil 10. Compute the factor of safety against the failure at any plane
Indicative Contents المحتويات الإرشادية	**Part one:** Soil formation , soil physics (water content , soil consistency , bulk density , soild density , void ratio, porosity , degree of saturation , specific gravity , Air content , compaction of soil , soil classification , soil permeability and ground water flow **(56 hours).** **Part two:** Stresses within the soil , the types of surface loads, the increasing of stress due to surface load at any point , principles stresses and Mohr circle, consolidation of soil, Consolidation coefficient , compressibility coefficient , swelling index , final settlement , the time of settlement , pre consolidation pressure ,types of consolidation , over consolidation ration **(56 hours).**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This module will be adopted through different strategies like; in-class lectures and interactive tutorials, field data collection, lab experiments,

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	64	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	128		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	4	10% (10)	1, 4, 7, & 8	LO #1, 4, 5, & 7
	Assignments	4	10% (10)	3, 9, 10, and 14	LO #3, 8, 10, & 11
	Projects / Lab.	1	10% (10)	Continuous	
	Report	2	10% (10)	4, 11	LO#2 & 9
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	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	Soil formation, clay minerals formation of minerals Clay structures
Week 2	Basic relationships (water content , soil consistency , bulk density , solid density , void ratio, porosity , degree of saturation , specific gravity , Air content ,)
Week 3	Soil consistency , Liquid limit , Shrinkage limit and plastic limit
Week 4	Soil compaction ; Max. dry density , optimum moisture content relative density and compaction percent
Week 5	Soil Classification , Dry sieve analysis , hydrometer test, grading characteristic
Week 6	Water treatment: description and design of flocculation unit; sedimentation process; description and design of sedimentation unit
Week 7	Classification of both soils coarse grained and fine grained
Week 8	Mid-term Exam
Week 9	Soil permeability , hydraulic gradient , coefficient of permeability , lab test methods
Week 10	Field test method of permeability
Week 11	Water force on soil , quicksand , boiling and heaving conditions , factor of safety against these conditions
Week 12	Flow of water in one dimension
Week 13	Two dimension water flow **(network flow)**
Week 14	Types of stresses in soil
Week 15	A preparatory week before the final exam
Week 16	Final exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Moister content test
Week 2	Soil consistency ; LL, Pl, Pi, SL
Week 3	Specific gravity
Week 4	Procter test , max density & optimum moisture content
Week 5	Field density
Week 6	Permeability ; constant head & falling head
Week 7	Grain size distribution test , wet sieve & classification

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	R. F. Craige soil mechanics 7th edition . A. Aysen Basic concepts and Engineering Applications	Yes
Recommended Texts	W.L.Lamb , R. V. Whitman Soil Mechanics	Yes

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	**Core**			■ **Theory** **Lecture** **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CE311**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Assist. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Applied Mathematics	**Semester**	E211
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- Enable knowledge and understanding of practical applications of engineering analysis. 2- Ability to identify different differential equations. 3- Ability to build a mathematical model to represent various engineering processes. 4- Ability to analyze and discuss. 5- Enable knowledge and understanding of practical applications by numerical methods. 6- Aability to identify different numerical method. 7- Brainstorming by encouraging students to produce a large number of ideas about an issue or problem. 8- Cooperative learning by working collectively.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Knowing types and classification of differential equations. 2- Ability to solve first order ordinary differential equations. 3- Recognizing some engineering applications on first order DE. 4- Ability to solve second and higher order linear ordinary DE. 5- Recognizing some engineering applications on second order DE. 6- Ability to solve a set of ordinary DE. 7- Ability to use matrices in solving a set of algebraic equations. 8- Identifying numerical methods and when to use them. 9- Ability to solve algebraic equations numerically. 10- Ability to solve a set of algebraic equations numerically. 11- Derivation of different functions by numerical methods. 12- Performing numerical integration to different functions. 13- Solving ordinary DE numerically. 14- Finding a suitable curve for a set of points. 15- Performing interpolation and extrapolation to approximate required functional value.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part One – Engineering Analysis 1- Introduction – Definition, classification, solution, and origin of differential equations DE. [2 hr] 2- First order ordinary differential equations ODE – Separable variables, homogeneous, exact, linear, Bernoulli's, reducible to first order DE. [20 hr] 3- Applications on 1st order ordinary differential equations – Orthogonal trajectories, suspended cables, flow through orifices, motion of bodies and general applications. [8 hr] 4- Second and higher order linear ordinary differential equations – Homogeneous and non-homogeneous linear DE with constant coefficients, undetermined coefficients method, variation of parameters method, linear DE with variables coefficients, Euler-Caushy equations, and Legender equations. [10 hr] 5- Applications on 2nd and higher order ordinary diff. equations – Deflection of beams, buckling of columns, deflection of beam-columns, simple vibration and vibration of structures. [14 hr]

	6- Simultaneous linear ordinary differential equations. [2] 7- Matrices and determinants for solving simultaneous algebraic equations - Cramer's rule, Gauss elimination, Gauss-Jordan elimination and matrix inverse. [4 hr] 8- Fourier series - Definition, type and applications of Fourier series. [8 hr] Part Two – Numerical Analysis 1- Introduction – Definition of numerical methods, exact and approximate solution and error calculation. [2 hr] 2- Numerical solution of algebraic equations –Bisection method, fixed-point iteration, Newton-Raphson method and modified Newton method. [6 hr] 3- Numerical solution to a set of algebraic equations –Solution of a set of linear equations, Jacobi method, Gauss-Siedel method and Solution of a set of non-linear equations. [4 hr] 4- Taylor series –Maclaurin series, Taylor series and application of Taylor series to approximate functions. [4 hr] 5- Numerical differentiation –Finite differences approximations and application of finite differences in derivation of different functions. [4 hr] 6- Numerical integration –Trapezoidal method, Simpson method and Romberg integration. [6 hr] 7- Numerical solution of ordinary differential equations ODE – Initial value problems, Euler's method, Runge-Kutta method, boundary value problems. [8 hr] 8- Curve fitting – Finding a suitable curve for a set of points using Least-squares criterion (linear regression), statistical comparison, and Non-polynomial models (nonlinear regression). [4 hr] 9- Interpolation and extrapolation – Interpolation with equally spaced data, Gregory-Newton forward interpolation formula, Lagrange interpolation polynomial and interpolation with unequally spaced data. [4 hr] 10- Numerical solution of partial differential equations PDE . [4 hr]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, develop the student's ability to perform duties and deliver them on time and logical and programmatic thinking to find solutions to various problems, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	4, 11	Lo # 1, 2, 3 and 9
	Assignments	2	10% (10)	6, 12	Lo # 1, 5, and 11
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	Lo # 9, 10, 11 and 12
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	Lo # 1 - 7
	Final Exam	2 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	First order ordinary differential equations ODE – Definition and classification of DE, Separable variables DE and homogeneous DE.
Week 2	First order ordinary differential equations ODE – Reducible to homogeneous DE, exact DE, reducible to exact DE and inspection method.
Week 3	First order ordinary differential equations ODE – Linear DE, Bernoulli's DE and reducible to first order DE. Applications on 1st order ordinary differential equations – Orthogonal trajectories.
Week 4	Applications on 1st order ordinary differential equations – Suspended cables, Flow through orifices, motion of bodies and general applications.
Week 5	Second and higher order linear ordinary differential equations – Homogeneous linear DE with constant coefficients, non-homogeneous linear DE with constant coefficients, undetermined coefficients method and variation of parameters method.

Week 6	Second and higher order linear ordinary differential equations – Linear DE with variables coefficients, Euler-Caushy equations, and Legender equations. Applications on 2nd and higher order ordinary differential equations – Deflection of beams, buckling of columns and deflection of beam-columns.
Week 7	Applications on 2nd and higher order ordinary differential equations – Simple vibration, undamped free vibration, undamped forced vibration, damped vibration and vibration of structures.
Week 8	Simultaneous linear ordinary differential equations. Matrices and determinants - Cramer's rule, Gauss elimination, Gauss-Jordan elimination and matrix inverse.
Week 9	Numerical Analysis – Introduction to numerical methods. Numerical solution of algebraic equations – Bisection method, fixed-point iteration, Newton-Raphson method and modified Newton method.
Week 10	Numerical solution of a set of algebraic equations – Solution of a set of linear equations, Jacobi method, Gauss-Siedel method and Solution of a set of non-linear equations. Taylor series – Definition, Maclaurin series and applications.
Week 11	Numerical differentiation – Finite differences calculus. Numerical integration – Trapezoidal and Simpson rule.
Week 12	Numerical integration – Applications and Romberg integration. Numerical solution of ordinary differential equations ODE – Initial value problems, Euler's method, Runge-Kutta method and Simultaneous differential equations.
Week 13	Numerical solution of ordinary differential equations ODE – Boundary value problems. Curve fitting – Least-squares criterion (linear regression) and Non-polynomial models (nonlinear regression).
Week 14	Interpolation and extrapolation – Gregory-Newton formula and Lagrange interpolation polynomial. Numerical solution of partial differential equations PDEs.
Week 15	Fourier series – Definition, types and applications of Fourier series.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Numerical solution of algebraic equations – Newton-Raphson method.
Week 2	Lab 2: Numerical solution to a set of algebraic equations – Gauss-Siedel method.
Week 3	Lab 3: Taylor series.
Week 4	Lab 4: Numerical integration – Simpson rule.
Week 5	Lab 5: Numerical integration – Romberg integration.
Week 6	Lab 6: Numerical solution of ordinary DE – Runge-Kutta method.
Week 7	Lab 7: Numerical solution of ordinary DE – Finite differences approximation.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- "Advanced Engineering Mathematics", Tenth Edition, Erwin Kreyszig, John Wiley & Sons, Inc., 2011. 2- "Numerical Methods for Engineers", Sixth Edition, Steven C. Chapra and Raymond P. Canale, McGraw-Hill Companies, Inc., 2010.	Yes
Recommended Texts	1- "Advanced Engineering Mathematics", Sixth Edition, Dennis G. Zill, Jones & Bartlett Learning, 2018. 2- "An Introduction to Numerical Methods and Analysis", Second Edition, James F. Epperson, John Wiley & Sons, Inc., 2013.	No
Websites	https://www.youtube.com/channel/UCxsxuE2-FcWiSyLjlCbJ6QQ?view_as=subscriber&authuser=0	

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**			**Module Delivery**	
Module Type	**Supportive**			☐ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**CE315**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Neamah abadulabbas		**e-mail**	Wi2335lliam1993@gmail.com	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**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	تعليم طلبة الدراسة الأولية كيفية التعامل مع البرامج الهندسية التطبيقية كبرنامج ETABS المستخدم لتحليل وتصميم المنشئات الحديدية والخرسانية وكذلك برنامج Microsoft projectالمستخدم في تخطيط المشاريع الانشائية وتخمين الكلف ومدة انجاز المشروع والسيطرة على المشاريع وتقييمها.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- تعليم الطلبة كيفية التعامل مع البرامج الانشائية بشكل متكامل والمقارنة مع الدراسة النظرية لتصميم وتحليل الأعضاء الانشائية وكيفية تسليط الاحمال على الأبنية الهيكلية بمختلف أنواعها. 2- تعليم الطلبة كيفية انشاء جداول الكميات للمشاريع الانشائية من خلال السيطرة على مسار العمل للمشروع الانشائي وكذلك إمكانية تخمين كميات المواد الانشائية بشكل عام.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	استخدام برامج هندسية مثل ETABS و Microsoft project

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	43	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
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)		
	Assignments	2	10% (10)		
	Projects / Lab.	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	Midterm Exam	2 hr	10% (10)		
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	مقدمة في برنامج ETABS
Week 2	تعريف المواد الانشائية المستخدمة في الأبنية الهيكلية وكذلك تعريف الأعضاء الانشائية
Week 3	تعريف الاحمال المختلفة المسلطة على المنشاء وكيفية تسليط الاحمال بشكل منفرد او متجمعة
Week 4	كيفية تقسيم الارضيات Floors بطريقة Strip method
Week 5	تحليل وتصميم المنشاء الهيكلي الخرساني
Week 6	كيفية الاستفادة من مخرجات البرنامج ومقارنتها مع الجانب النظري
Week 7	عمل سمينار للطلبة بشكل مجاميع
Week 8	اختبارات لأبنية مختلفة للوقوف على مدى فهم الطالب
Week 9	مقدمة في برنامج Microsoft project (مفهوم ادارة المشروعات)
Week 10	المراحل الأساسية للمشروع + عناصر ادارة المشروعات
Week 11	إدارة وتخطيط المشروع باستخدام MS Project
Week 12	إدخال بيانات المشروع الأولية
Week 13	تسجيل صفات المشروع + إدخال المهام والمدة الزمنية
Week 14	ضبط تقويم المشروع
Week 15	عمل سمينار للطلبة بشكل مجاميع
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		Yes
Recommended Texts		No
Websites	• User's Guide ETABS® 2016 https://ottegroup.com/wp-content/uploads/2021/02/ETABS2016-Users-Guide.pdf • دليل مبسط لاستخدام برنامجMS PROJECT file:///C:/Users/user/Downloads/[KtabPDF.Com]1493303430Jj9M1%20(1).pdf D:\Downloads\User's Guide ETABS® 2016 https:\ottegroup.com\wp-content\uploads\2021\02\ETABS2016-Users-Guide.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	**Reinforced Concrete Design**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**CE322**				
ECTS Credits	**10**				
SWL (hr/sem)	**250**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Ahmed Nasrast Mohammed		**e-mail**	ahmed.nasrat@iuc.edu.iq	
Module Leader's Acad. Title	Assistant lecturers		**Module Leader's Qualification**	MSc.	
Module Tutor	Ahmed Nasrast Mohammed		**e-mail**	ahmed.nasrat@iuc.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mechanics of materials	**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	The aim of the course on reinforced concrete design according to the ACI code is to provide students with the necessary knowledge and skills to design safe and efficient reinforced concrete structures. The course aims to: 1. Familiarize students with the principles and concepts underlying reinforced concrete design. 2. Introduce participants to the ACI code and its requirements for reinforced concrete design. 3. Develop proficiency in the strength design method used for reinforced concrete structures. 4. Equip students with the ability to design rectangular beams with single and double reinforcement. 5. Enable participants to analyze and design T-beams. 6. Familiarize students with the analysis and design of continuous beams, one-way slabs, two-way slabs, columns, and load calculations on columns. 7. Create awareness of important design considerations such as constructability, sustainability, and quality control. 8. Enhance critical thinking and evaluation skills in structural design. By the end of the course, students will be equipped with the necessary tools and understanding to confidently design reinforced concrete structures in compliance with the ACI code, ensuring safety, efficiency, and adherence to industry standards.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The learning outcomes of the course on reinforced concrete design according to the ACI code include: 1. Understanding of reinforced concrete design principles and the ACI code requirements. 2. Proficiency in the strength design method for reinforced concrete structures. 3. Ability to design rectangular beams with single and double reinforcement. 4. Competence in the analysis and design of T-beams. 5. Proficiency in analyzing and designing continuous beams, one-way slabs, two-way slabs, columns, and load calculations on columns. 6. Development of practical problem-solving skills through exercises and case studies. 7. Awareness of design considerations such as constructability, sustainability, and quality control. 8. Enhancement of critical thinking and evaluation skills in structural design. 9. Overall, students will acquire the knowledge and skills needed to design safe and efficient reinforced concrete structures in accordance with the ACI code.
Indicative Contents المحتويات الإرشادية	Course Description: Reinforced Concrete Design I according to ACI Code This course offers a comprehensive understanding of reinforced concrete design principles and methodologies based on the ACI 318 (American Concrete

	Institute) code. Students will gain knowledge and practical skills required for designing safe and efficient reinforced concrete structures. Course Outline: • Introduction to Reinforced Concrete Design -Overview of reinforced concrete structures and their applications -Historical background and development of design codes (ACI code) -Importance of code compliance, safety considerations, and professional ethics • Principles of Reinforced Concrete Design -Behavior and properties of concrete and reinforcement -Stress-strain relationship, elastic and plastic behavior of materials • Strength Design Method -Introduction to the strength design method -Flexural design of reinforced concrete beams using the ACI code -Calculation of moment and shear forces -Design considerations for deflection, cracking control, and serviceability • Analysis and Design of Rectangular Beams with Single Reinforcement -Assumptions and design assumptions for rectangular beams -Calculation of required reinforcement area and moment capacity • Analysis and Design of Rectangular Beams with Double Reinforcement -Need for double reinforcement in beam design -Calculation of balanced reinforcement ratio -Design procedure and detailing requirements for doubly reinforced beams • Analysis and Design of T-Beams -Introduction to T-beams and their advantages -Calculation of effective flange width, moment redistribution -Shear design and detailing requirements for T-beams • Continuous Beams -Behavior and design considerations for continuous beams -Calculation of support reactions and distribution of moments -Determination of reinforcement requirements and detailing • One-Way Slabs -Design principles for one-way slabs, including simply supported and continuous slabs -Calculation of slab thickness, reinforcement requirements, and development of moment and shear diagrams -Consideration of deflection control and serviceability criteria • Two-Way Slabs -Behavior and design of two-way slabs -Introduction to different design methods, -Calculation of reinforcement requirements, punching shear, and detailing considerations • Analysis and Design of Columns -Introduction to column behavior, including axial load and bending moments -Calculation of axial and flexural design strength -Design considerations for column reinforcement and detailing requirements

	• Load Calculation on Columns -Understanding and application of load combinations according to relevant design codes Calculation of gravity loads, including dead loads and live loads Throughout the course, students will engage in practical exercises, design problems, and case studies to reinforce their understanding and apply the learned concepts.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategies for the training course in reinforced concrete design include: • Lectures and Presentations: Instructors will deliver informative lectures to explain key concepts and design principles. • Design Examples and Case Studies: Practical examples and case studies will be used to illustrate the application of design principles in real-world scenarios. • Hands-on Exercises: Participants will engage in design calculations and problem-solving exercises to apply learned concepts. • Group Discussions and Peer Learning: Collaborative activities will encourage knowledge sharing among participants. • Software Demonstrations: Participants will be introduced to software tools used in reinforced concrete design. • Interactive Q&A Sessions: Regular sessions will address participants' questions and provide clarification. • Assessments and Feedback: Quizzes and assignments will assess participants' progress. • Resources and Reference Materials: Course materials and reference books will be provided. • Guest Speakers (if applicable): Industry experts may be invited to share their experiences. These strategies aim to create an engaging learning environment that promotes active participation, practical skill development, and knowledge retention.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	122	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	128	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	8.53
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	250		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	3, 6, 9, 12	All
	Assignments	2	10% (10)	4, 8, 12	All
	Projects / Lab.	0	0% (0)		
	Report	0	0% (0)		
Summative assessment	**Midterm Exam**	2hr	20% (10)	10	1-5
	Final Exam	2hr	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Principles of Reinforced Concrete Design
Week 2	Strength Design Method
Week 3	Flexural design of reinforced concrete beams using the ACI code
Week 4	Analysis and Design and of Rectangular Beams with Single Reinforcement
Week 5	Analysis and Design of Rectangular Beams with Double Reinforcement
Week 6	Analysis and Design of T-Beams
Week 7	Design of beam shear reinforcement
Week 8	Behavior and Design Considerations for Continuous Beams
Week 9	Load Calculation on Structural Members

Week 10	Mid Term Exam
Week 11	Behavior and Design of One-Way Slab
Week 12	Behavior and Design of Two-Way Slabs
Week 13	Analysis and Design of Short Columns with Axial Load
Week 14	Analysis and Design of Short Columns with Eccentric Load
Week 15	Review Sessions, Design Workshops, and Case Studies
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	American Concrete Institute's/Building Code Requirements for Structural Concrete (ACI 318-14). Design of Reinforced Concrete Structures /Arthur H. Nilson, David Darwin, Charles W. Dolan-14th edition	No
Recommended Texts	Design of reinforced concrete/ Jack C. McCormac, Russell H. Brown-10th edition	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	**Irrigation and Drainage Engineering**			**Module Delivery**	
Module Type	**Core**			×**Theory** × **Lecture** ☐ **Lab** × **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CE317**				
ECTS Credits	**9**				
	225				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Civil Eng. Dept.		**College**	Iraq University College	
Module Leader	Dr. Abdul-Khaliq Mahmud HUSSAIN		**e-mail**	dr.eng.abdulkhaliq@gmail.com	
Module Leader's Acad. Title	Associated Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Abdul-Khaliq Mahmud HUSSAIN		**e-mail**	dr.eng.abdulkhaliq@gmail.com	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	25/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fluid Mechanics and Soil Mechanics	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Preparing and qualifying the civil engineers to meet the requirements of the labor market in the public and private and public sectors in irrigation and drainage engineering through diversifying the use of learning and teaching methods and training students to apply the acquired knowledge and skills to

	solve real problems of irrigation and drainage engineering designs. 2. Presenting different designs of irrigation and drainage engineering methods, both theoretical and practical, to comply with international standards of academic quality and meet the needs of the labor market. 3. Develop the knowledge and the method of scientific research in the field of irrigation and drainage engineering in a way that contributes to developing the design method, managing water resources and reducing waste in water resources. 4. Preparing a scientific basis to keep pace with scientific development and pave the way for studying accurate topics in this specialty. 5. It serves the needs of the governmental and private sectors and the society in all its institutions to establish irrigation and drainage systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Clarify the basic concepts of irrigation and drainage engineering systems and their applications in agricultural fields 2. Gaining the ability to address water wastage problems through the design of irrigation systems. 3. Acquisition of basic skills in the management of irrigation and drainage systems. 4. Gaining experience in designing the irrigation and drainage system and its suitability according to the different surrounding conditions.
Indicative Contents المحتويات الإرشادية	1. Definition of Irrigation and Drainage Processes used in an Agricultural Farm, benefits of Irrigation and Drainage networks [8 hrs] 2. Types of irrigation and Drainage methods, evaluating natural Irrigation Water Resources [8 hrs] 3. Moisture content classification in the soil of Roots Zone, calculation of value of moisture content in the soil of Roots Zone, methods of calculating value of Water Consumption Use of crops in the farm, Efficiency and Leaching Requirement [8 hrs] 4. Types of Irrigation Systems, Types of Surface Irrigation System [8 hrs] 5. Design of Surface irrigation System and of Open Channels [8 hrs] 6. Design of Sprinkler Irrigation system [8 hrs] 7. Design of Dripping irrigation System[8 hrs] 8. Irrigation and Drainage project investigations [8 hrs] 9. Soil permeability, calculating value of the permeability coefficient [8 hrs] 10. Types of Drainage processes, Types of Drainage Systems [8 hrs] 11. Design of Open Drains [8 hrs] 12. Hooghoudt equation, Hooghoudt equation for layered soil [8 hrs] 13. Vertical drainage [8 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in introducing this module is to encourage students to participate in the exercises, while at the same time improving and expanding their critical thinking skills. This will be achieved through classes and interactive tutorials and by thinking about the type of simple experiments that include some sampling activities that are of interest to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	133	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	8.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	250		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Porous Soil, Definition of Irrigation and Drainage Processes, Benefits of Irrigation and Drainage Processes ,Irrigation Water Behavior,

Week 2	Types of irrigation and Drainage Systems, Irrigation Water Quality and Quantity, Irrigation System Requirements.
Week 3	Irrigation Systems, Efficiency, Leaching Requirement, Irrigation Water and Soil Salinity.
Week 4	Applications
Week 5	Classification of Soil Moisture content, Calculation value of Soil moisture Content, Calculating value of Water Consumption Use (Evapotranspiration) of Crops in the Farm.
Week 6	Design of Surface Irrigation System, Methods of Surface Irrigation System.
Week 7	Applications
Week 8	Types of Open Channels, Flow in Open Channels, Design of Open Channels.
Week 9	FLOW MESUREMENT IN OPEN CHANNELS, Types of Weirs.
Week 10	Design of Sprinkler Irrigation System, Design of Dripping Irrigation System
Week 11	Applications
Week 12	Drainage project investigations, Permeability coefficient
Week 13	Types of drainage systems
Week 14	Design of open drains.
Week 15	Hooghoudt equation, Design of Subsurface Tile drains (Applications of Hooghoudt equation).
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Field Irrigation Systems Engineering, Drainage Engineering	Yes
Recommended Texts		No
Websites	Websites specialized in irrigation and drainage engineering	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Traffic and Transportation Engineering			**Module Delivery**	
Module Type	Core			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CE319				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	M.Sc. Iman Ali Talib		**e-mail**	iemantaleb93@gmail.com	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This module will present the basic design concepts of Traffic Engineering to the students. The module will also present the Intersection Control and Design to the students. In addition to presenting the basic concepts of Transportation Engineering and Planning to the students which includes trip generation, trip distribution, traffic assignment and modal split. Also, the module will introduce an introduction to the Public Transportation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The students will be able to: ▪ Identify and define the Traffic Operations at the highways by conducting several traffic surveys and studies such as Speed, Volume, Capacity, Travel Time, Delay, and Parking; and build the relationship among the traffic stream parameters. ▪ Also, the students will be able to identify the basic concepts of Traffic Control and will be able to design an at-grade Intersection Control. ▪ In addition, the students will also be able to identify where the trips come from and where they go, and what modes and which routes will be used. ▪ Also, the students will be able to identify the basic concepts of public Transportation and will be able to design and construct Bus Time schedules and determine the capacity of Bus Stops.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Learning and Teaching Strategies استراتيجيات التعلم والتعليمStrategies The main strategy to delivering this module will be through classes. In addition, to the laboratory. Also, we will try to encourage the students to participate in assignments, writing reports about their projects and present their works in seminars

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	7 12	Outcome 1 and 2 Outcome 3 and 4
	Assignments	2	10% (10)	8 13	Outcome 1 and 2 Outcome 3 and 4
	Projects / Lab.	1	10% (10)	8	Outcome 1 and 2
	Report	1	8	14	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	14	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction and Background of Traffic Engineering
Week 2	Volume Studies
Week 3	Speed Studies
Week 4	Travel Time and Delays Studies Parking Studies
Week 5	Parking Studies
Week 6	Traffic Flow Elements

Week 7	Intersection Control and Traffic Signals
Week 8	Intersection Control Design
Week 9	Overview and History of Transportation Engineering
Week 10	Urban Transportation Planning
Week 11	Trip Generation
Week 12	Trip Distribution
Week 13	Modal Split and Traffic Assignment
Week 14	Public Transportation
Week 15	**Mid Term Exam**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Traffic Volume at Highways
Week 2	Traffic Volume at Intersection
Week 3	Spot Speed and Radar Gun Speed Meter
Week 4	Space Mean Speed
Week 5	Headway and Gap
Week 6	Traffic Delay at Intersection
Week 7	Saturation Flow Rate and Capacity

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	▪ Traffic & Highway Engineering 4th Edition	Available (Softcopy)
Recommended Texts	▪ Transportation and Traffic Engineering Handbook (Institute of Traffic Engineers) ▪ Highway Capacity Manual (HCM, 2010) (Transportation Research Board)	Available (Softcopy)
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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer applications**			**Module Delivery**	
Module Type	**Supportive**			☐ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**CE315**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	تعليم طلبة الدراسة الأولية كيفية التعامل مع البرامج الهندسية التطبيقية كبرنامج ETABS المستخدم لتحليل وتصميم المنشئات الحديدية والخرسانية وكذلك برنامج Microsoft projectالمستخدم في تخطيط المشاريع الانشائية وتخمين الكلف ومدة انجاز المشروع والسيطرة على المشاريع وتقييمها.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- تعليم الطلبة كيفية التعامل مع البرامج الانشائية بشكل متكامل والمقارنة مع الدراسة النظرية لتصميم وتحليل الأعضاء الانشائية وكيفية تسليط الاحمال على الأبنية الهيكلية بمختلف أنواعها. 2- تعليم الطلبة كيفية انشاء جداول الكميات للمشاريع الانشائية من خلال السيطرة على مسار العمل للمشروع الانشائي وكذلك إمكانية تخمين كميات المواد الانشائية بشكل عام.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	استخدام برامج هندسية مثل ETABS و Microsoft project

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	43	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
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)		
	Assignments	2	10% (10)		
	Projects / Lab.	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	Midterm Exam	2 hr	10% (10)		
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	مقدمة في برنامج ETABS
Week 2	تعريف المواد الانشائية المستخدمة في الأبنية الهيكلية وكذلك تعريف الأعضاء الانشائية
Week 3	تعريف الاحمال المختلفة المسلطة على المنشاء وكيفية تسليط الاحمال بشكل منفرد او متجمعة
Week 4	كيفية تقسيم الارضيات Floors بطريقة Strip method
Week 5	تحليل وتصميم المنشاء الهيكلي الخرساني
Week 6	كيفية الاستفادة من مخرجات البرنامج ومقارنتها مع الجانب النظري
Week 7	عمل سمينار للطلبة بشكل مجاميع
Week 8	اختبارات لأبنية مختلفة للوقوف على مدى فهم الطالب
Week 9	مقدمة في برنامج Microsoft project (مفهوم ادارة المشروعات)
Week 10	المراحل الأساسية للمشروع + عناصر ادارة المشروعات
Week 11	إدارة وتخطيط المشروع باستخدام MS Project
Week 12	إدخال بيانات المشروع الأولية
Week 13	تسجيل صفات المشروع + إدخال المهام والمدة الزمنية
Week 14	ضبط تقويم المشروع
Week 15	عمل سمينار للطلبة بشكل مجاميع
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		Yes
Recommended Texts		No
Websites	• User's Guide ETABS® 2016 https://ottegroup.com/wp-content/uploads/2021/02/ETABS2016-Users-Guide.pdf • دليل مبسط لاستخدام برنامجMS PROJECT file:///C:/Users/user/Downloads/[KtabPDF.Com]1493303430Jj9M1%20(1).pdf D:\Downloads\User's Guide ETABS® 2016 https:\ottegroup.com\wp-content\uploads\2021\02\ETABS2016-Users-Guide.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	**Design of Concrete Structure**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**CE422**				
ECTS Credits	**9**				
SWL (hr/sem)	**225**				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Ahmed Nasrast Mohammed		**e-mail**	ahmed.nasrat@iuc.edu.iq	
Module Leader's Acad. Title	Assistant lecturers		**Module Leader's Qualification**	MSc.	
Module Tutor	Ahmed Nasrast Mohammed		**e-mail**	ahmed.nasrat@iuc.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Reinforced Concrete Design	**Semester**	6
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aim of the this course is to provide participants with a comprehensive understanding of the principles, methods, and practices involved in designing reinforced concrete structures. The course aims to equip participants with the necessary knowledge and skills to design safe, efficient, and sustainable concrete structures while adhering to relevant design codes and standards. The course seeks to achieve the following objectives: 1) Familiarize students with advanced concepts and methodologies in reinforced concrete design, including design of two way slab on beam, design of flat slab, design of flat plate slab, design of waffle slab, unsway slender column analyses and design, sway slender column analyses and design, prestress analyses and design, and raft foundation design. 2) Develop students' proficiency in analyzing and designing unsway slender columns, considering axial load, moment, and reinforcement requirements. 3) Enable students to analyze and design sway slender columns, taking into account lateral loads, effective length, and lateral stability requirements. 4) Provide students with the necessary knowledge and skills to analyze and design prestressed structures, considering prestressing principles, beam and slab design, and detailing requirements. 5) Foster critical thinking and problem-solving abilities through theoretical discussions, problem-solving exercises, and design projects. 6) Enhance students' ability to interpret and apply relevant design codes and standards in the context of advanced reinforced concrete design. 7) Promote effective communication of design decisions and solutions. 8) Prepare students for advanced studies or professional practice in the field of reinforced concrete design. Ultimately, the aim of the course is to empower participants with the necessary expertise and capabilities to design reinforced concrete structures that are safe, economical, sustainable, and meet the specific needs of clients and stakeholders.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Comprehensive understanding of advanced topics in reinforced concrete design, including design of two way slab on beam, design of flat slab, design of flat plate slab, design of waffle slab,unsway slender column analyses and design, sway slender column analyses and design, prestress analyses and design, and raft foundation design. ➢ Students will be familiarized with different design methods, including the direct design method for two-way slabs, design of flat slab systems, flat plate slab systems, waffle slab systems, and yield line analysis for slabs. They will gain practical experience in applying these methods to real-world design scenarios. ➢ Proficiency in analyzing and designing unsway slender columns, considering axial load, moment, and reinforcement requirements.

	➢ Ability to analyze and design sway slender columns, considering lateral loads, effective length, and lateral stability requirements. ➢ Competence in the analysis and design of prestressed structures, understanding the principles of prestressing and the implications on beam and slab design. ➢ Application of design codes and standards relevant to advanced reinforced concrete design. ➢ Development of critical thinking and problem-solving skills through theoretical discussions, problem-solving exercises, and design projects. ➢ Ability to integrate design considerations such as structural stability, safety, and practicality into the design process. ➢ Enhanced communication skills in conveying design decisions and solutions. By the end of the course, students will have gained the knowledge, skills, and confidence to tackle complex design challenges in reinforced concrete structures, meeting industry standards and ensuring safety and efficiency.
Indicative Contents المحتويات الإرشادية	This course provides students with a comprehensive understanding of advanced topics in reinforced concrete design. The course covers essential topics such as the minimum thickness of two-way slabs, shear resistance of two-way slabs, direct design method of two-way slabs, design of two-way slabs with beams, design of flat slab system, design of flat plate slab system, design of Waffle Slab System, design of shear head reinforcement, adesign of unsway slender columns, sway slender columns and prestressed structures. Students will learn the principles, methodologies, and practical considerations required for designing complex reinforced concrete structures. Course Outline: • Introduction to Advanced Reinforced Concrete Design Overview of advanced topics in reinforced concrete design Importance of structural stability and design considerations • Introduction to Reinforced Concrete Design Overview of reinforced concrete as a construction material Properties, advantages, and applications of reinforced concrete • Minimum Thickness of Two-Way Slabs Calculation of minimum thickness requirements for two-way slabs Considerations for different loading conditions and span-to-depth ratios • Shear Resistance of Two-Way Slabs Understanding shear behavior in two-way slabs Calculation of shear capacity and reinforcement requirements • Direct Design Method of Two-Way Slabs Application of the direct design method for two-way slabs Design considerations for moments and shears • Design of Two-Way Slabs with Beams Design principles for two-way slabs with supporting beams Calculation of moments, shears, and reinforcement requirements • Design of Flat Slab System

	Introduction to flat slab system design Reinforcement detailing, punching shear considerations, and deflection control • Design of Flat Plate Slab System Design considerations for flat plate slab systems Load distribution, flexural reinforcement, and shear reinforcement • Design of Waffle Slab System Principles of design for waffle slab systems Calculation of moments, shears, and reinforcement requirements • Unsway Slender Column Analysis and Design Behavior and design considerations for unsway slender columns Calculation of axial load, moment, and shear distribution Determination of reinforcement requirements and detailing • Sway Slender Column Analysis and Design Analysis of sway slender columns under lateral loads Calculation of effective length and slenderness ratio Design considerations for lateral stability and reinforcement detailing • Prestressed Concrete Introduction to prestressed concrete design principles Analysis and design of prestressed beams and slabs Consideration of prestressing losses and detailing requirements Throughout the course, students will engage in theoretical discussions, problem-solving exercises, and design projects to reinforce their understanding of advanced reinforced concrete design principles. Practical examples and case studies will be used to illustrate the application of design concepts in real-world scenarios.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategies for the training course in reinforced concrete design include: • Lectures and Presentations: Instructors will deliver informative lectures to explain key concepts and design principles. • Design Examples and Case Studies: Practical examples and case studies will be used to illustrate the application of design principles in real-world scenarios. • Hands-on Exercises: Participants will engage in design calculations and problem-solving exercises to apply learned concepts.

	• Group Discussions and Peer Learning: Collaborative activities will encourage knowledge sharing among participants. • Software Demonstrations: Participants will be introduced to software tools used in reinforced concrete design. • Interactive Q&A Sessions: Regular sessions will address participants' questions and provide clarification. • Assessments and Feedback: Quizzes and assignments will assess participants' progress. • Resources and Reference Materials: Course materials and reference books will be provided. • Guest Speakers (if applicable): Industry experts may be invited to share their experiences. These strategies aim to create an engaging learning environment that promotes active participation, practical skill development, and knowledge retention.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	9
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	133	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	8.9
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	225		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	3 , 6, 9, 12	All
	Assignments	2	10% (10)	4, 8, 12	All
	Projects / Lab.	0	0% (0)		
	Report	0	0% (0)		
Summative assessment	**Midterm Exam**	2hr	20% (10)	11	1-5
	Final Exam	2hr	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Minimum Thickness of Two Way Slab
Week 2	Shear Resistance and Direct Design Method of Two-Way Slab
Week 3	Design of Two-Way Slabs with Beam
Week 4	Design of Flat Slab System
Week 5	Design of Flat Plate Slab System
Week 6	Shear Design in Fat Plates and Flat Slab
Week 7	Design of Waffle Slab System
Week 8	Slender Columns–Fundamental Concept
Week 9	Design and Analysis of Slender Reinforced Concrete Braced Columns
Week 10	Design and Analysis of Slender Reinforced Concrete Unbraced Columns
Week 11	Mid Term Exam
Week 12	Analysis and Design of Prestressed Concrete Beams
Week 13	Losses in Pre-stressed concrete members
Week 14	Cracking Moment of Prestressed Concrete Beams
Week 15	Review Sessions, Design Workshops, and Case Studies
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	American Concrete Institute's/Building Code Requirements for Structural Concrete (ACI 318-14). Design of Reinforced Concrete Structures /Arthur H. Nilson, David Darwin, Charles W. Dolan-14th edition	No
Recommended Texts	Design of reinforced concrete/ Jack C. McCormac, Russell H. Brown-10th edition	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	**Foundation Engineering**			**Module Delivery**	
Module Type	**Core**			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CE416**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Lecturer Angham Ali Mohammed		**e-mail**	Angham.19911993@gmail.com	
Module Leader's Acad. Title			**Module Leader's Qualification**	MS.C	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	29/07/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Soil Mechanics Concrete Design	**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	This course is intended to; 1. To assess the general appropriateness of the site and to allow a suitable and cost-effective design for the proposed project. 2. Determine the soil's safe bearing capability. 3. Determine the shallow foundation settlement. 4. Estimate the size of shallow foundations to satisfy bearing capacity and settlement criteria. 5. Provide the steps of structural design for shallow foundations. 6. Determine the allowable axial load capacity of single piles and pile groups. 7. Determine the settlement of single pile and pile groups. 8. Understand and determine lateral earth pressure. 9. Understand the forces that lead to instability of earth retaining structures. 10. Determine the stability of eath retaining structures (retaining walls, sheet pile walls, braced excavation).
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	When the student complete studying this course, he should be able to: 1. Understand the importance of soil investigations and be able to plan a soil investigation. 2. Estimate the bearing capacity and settlement of structures founded on soils. 3. Calculate stresses in soils from external loads. 4. Calculate one-dimensional consolidation settlement and time rate of settlement for foundations. 5. Estimation of elastic and secondary settlement for foundations. 6. Analyze and design shallow foundations. 7. Determine the allowable axial load capacity of single pile and pile group. 8. Estimation of pile load in a pile group. 9. Determine the stability of earth structures.
Indicative Contents المحتويات الإرشادية	• Chapter 1 discusses foundations, their importance, classification, and requirements; • Chapter 2 discusses soil subsurface exploration, soil samples and causes of Disturbance ... ect.. In-Situ (Field) Tests, Standard Penetration Test - Cone Penetration Test (CPT) - Vane Shear Test (VST) - Plate Loading Test (PLT) - Soil Exploration Report • Chapter 3; Discuss the calculation of the Bearing Capacity for the Shallow Foundations by many theories ; Introduction, Bearing Capacity, Modes of Soil Failure, Terzaghi's Bearing Capacity Equation, Factor of Safety, Effect of Water Table on B.C., Meyerhof's Bearing Capacity Equation, General (Hansen's) Bearing Capacity Equation, Skempton's Method [φ = 0], Footings

	with Eccentric Loadings, Footing on Layered Soils, Bearing Capacity of Footings Adjacent to a Slope, Bearing Capacity from Field Tests • Chapter 4; Foundation Settlement; Introduction, Contact Pressure, Stresses in a Soil Mass, Consolidation Settlement, Secondary Settlement, Allowable Settlement • Chapter 5; Spread Footing Design; Ultimate Strength Design Method (USD) (ACI: 318 - 19), Design of R.C. Spread Footings, Design of Plain Concrete Spread Footings, Rectangular Footings, Eccentrically Loaded Spread Footings • Chapter 6; Combined Footing Design; Introduction, Rectangular Combined Footing, Trapezoidal Combined Footing, Strap (or Cantilever) Footing • Chapter 7; Mat Foundation Design; Introduction, Types of Mat Foundations, Bearing Capacity of Mat Foundations, Mat Settlements, Design of Mat Foundations • Chapter 8; Pile Foundations: Single Pile Analysis; Introduction, Classification of Piles, Static Pile Capacity, Point Bearing Capacity, Point Bearing from Field Tests, SPT, CPT, Skin Friction Capacity, Pile Loading Test-Axial Compression (ASTM-D1143), Pile Capacity – Dynamic Analysis • Chapter 9; Pile Foundations: Groups; Introduction, The Carrying Capacity of Pile Groups, Efficiency of Pile Groups, Settlement of Pile Groups, Pile Caps, Negative Skin Friction • Chapter 10; Lateral Earth Pressure; Introduction, Coulomb Earth Pressure Theory, Rankine Earth Pressures • Chapter 11; Retaining Walls; Introduction, Stability of Retaining Walls, Base Key. • Chapter 12; Sheet Pile Walls; Introduction, Types of sheetpiling, Safety Factor, Cantilever Sheetpiling, Anchored Sheetpiling: Free-Earth Support, Capacity of Deadman, Location of Deadman.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching is a process that encourages students to connect their experiences and develop critical thinking skills and problem-solving abilities. Exams should combine different concepts from individual examples and homework problems, rather than evaluating a student's ability to solve a given problem. The goal is to determine if students understand and can apply the concepts required to solve the problem. Students' work is graded based on the process used in solving the problem, rather than the final answer.

	A professor should be sensitive to students' backgrounds and preparation, as the way they are treated greatly influences their performance. They should demonstrate respect for each student as an individual and their contributions to the learning process. A relaxed classroom atmosphere encourages students to contribute and ask questions. Opportunities for reflection and feedback, such as after-class and office discussions, peer-to-peer feedback, and formal and informal evaluations, are provided to facilitate learning. Students' responses and inputs are crucial for improving teaching skills.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	20% (20)	3 , 7, 10	All
	Assignments	2	10% (10)	2,4,6,8,10,12	All
	Projects/Lab.	0	0% (0)		
	Report	1	10% (10)		
Summative assessment	**Midterm Exam**	2 hr	10% (10)	10	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	Chapter 1 discusses foundations, their importance, classification, and requirements; Chapter 2 discusses soil subsurface exploration, soil samples and causes of Disturbance ... ect
Week 2	Discuss the In-Situ Tests. such as Cone Penetration Test, Standard Penetration Test, Vane Shear Test, ASTM-D1194, Plate Loading Test (PLT) ... ect Chapter 3; Discuss the calculation of the Bearing Capacity for the Shallow Foundations by many theories ; Introduction, Bearing Capacity, Modes of Soil Failure, Terzaghi's Bearing Capacity Equation, Factor of Safety, Effect of Water Table on B.C., Meyerhof's Bearing Capacity Equation,
Week 3	General (Hansen's) Bearing Capacity Equation, Skempton's Method [φ = 0], Footings with Eccentric Loadings, Footing on Layered Soils, Bearing Capacity of Footings Adjacent to a Slope, Bearing Capacity from Field Tests
Week 4	Chapter 4; Foundation Settlement; Introduction, Contact Pressure, Stresses in a Soil Mass,
Week 5	Consolidation Settlement, Secondary Settlement, Allowable Settlement
Week 6	Chapter 5; Spread Footing Design; Ultimate Strength Design Method (USD) (ACI: 318 - 19), Design of R.C. Spread Footings, Design of Plain Concrete Spread Footings,
Week 7	Rectangular Footings, Eccentrically Loaded Spread Footings Chapter 6; Combined Footing Design; Introduction, Rectangular Combined Footing,
Week 8	Trapezoidal Combined Footing, Strap (or Cantilever) Footing Chapter 7; Mat Foundation Design; Introduction, Types of Mat Foundations, Bearing Capacity of Mat Foundations, Mat Settlements, Design of Mat Foundations
Week 9	Chapter 8; Pile Foundations: Single Pile Analysis; Introduction, Classification of Piles, Static Pile Capacity, Point Bearing Capacity, Point Bearing from Field Tests, SPT, CPT,
Week 10	Skin Friction Capacity, Pile Loading Test-Axial Compression (ASTM-D1143), Pile Capacity – Dynamic Analysis
Week 11	Chapter 9; Pile Foundations: Groups; Introduction, The Carrying Capacity of Pile Groups, Efficiency of Pile Groups, Settlement of Pile Groups, Pile Caps, Negative Skin Friction

Week 12	Chapter 10; Lateral Earth Pressure; Introduction, Coulomb Earth Pressure Theory, Rankine Earth Pressures
Week 13	Chapter 11; Retaining Walls; Introduction, Stability of Retaining Walls, Base Key.
Week 14	Chapter 12; Sheet Pile Walls; Introduction, Types of sheetpiling, Safety Factor, Cantilever Sheetpiling,
Week 15	Anchored Sheetpiling: Free-Earth Support, Capacity of Deadman, Location of Deadman.
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Foundation Analysis and Design By; Joseph E. Bowles	No
Recommended Texts	Principles of Foundation Engineering – Ninth Edition By; Braja M. Das and Nagaratnam Sivakugan	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	**Engineering Hydrology**			**Module Delivery**	
Module Type	**Core**			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CE418**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Type Dept. Code		**College**	Iraq University College	
Module Leader	Dr. Ahmad Al-Kadhimi		**e-mail**	al_kadhimi4@yahoo.com	
Module Leader's Acad. Title	Ass. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Ahmad Al-Kadhimi		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	/ /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. Preparing and qualifying specialized engineers to meet the requirements of the labor market in the private and public sectors in civil engineering through diversification of methods of learning and educating and training students to apply the acquired knowledge and skills to solve real problems. 2. Providing distinguished academic programs in the field of civil engineering, both theoretical and practical, that comply with international standards of academic quality and meet the needs of the labor market.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Outline the physical processes in the context of hydrology, including the hydrological cycle in general. 2- Define and understand key concepts related to hydrology, such as relative and cumulative frequency, the use of statistical data distributions, time of concentration, runoff and rainfall hydrographs, catchment storage, flood routing. 3- Apply a range of common techniques, such as flood frequency analysis, probabilistic rational, to estimate design peak flows. 4- Apply runoff-routing methods, rainfall hyetograph estimation to estimate flood hydrographs. 5- Compare and evaluate a number of methods for determining peak flows and flood hydrographs for urban and rural areas, including flood frequency analysis, the rational methods, the regional method and runoff routing methods. 6- Define and describe processes groundwater systems. Application the Darcy's law to determine groundwater.
Indicative Contents المحتويات الإرشادية	This course serves as an introduction to the field of engineering hydrology. It covers fundamentals such as the hydrological cycle, catchment, hyetographs, losses, and hydrographs. Design topics covered will be selected from: flood frequency analysis, determination of design rainfall intensity and hyetographs, peak flow estimation, design hydrograph estimation, and groundwater process.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, and interactive tutorials.

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

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)		
	Assignments	2	10% (10)		
	Projects / Lab.	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	**Midterm Exam**	2 hr	10% (10)		
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction and Hydrologic Process
Week 2	Hydrologic Process
Week 3	Hydro-Met Data
Week 4	Precipitation and other types of Data
Week 5	Rainfall Measurements
Week 6	Average Rainfall over the area
Week 7	Missing Rainfall Records

Week 8	Rainfall Mass Carve and Hyetographs
Week 9	Evaporation and Transportation
Week 10	Infiltration Process
Week 11	Measurements of Infiltration Rates
Week 12	Horten and Phi Index Method
Week 13	Streamflow and Area Velocity Area Method
Week 14	Presentation of streamflow Data
Week 15	An introduction to Groundwater Hydrology
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering Hydrology / E. M. Wilson	Yes
Recommended Texts	A textbook of Hydrology/ Dr P. Jajo Rami Reddy	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	**Method of construction and estimation**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CE418**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. **Understanding Construction Methods**: Gain a comprehensive understanding of various construction methods, including traditional and modern techniques used in civil engineering projects. 2. **Estimation Techniques**: Learn how to estimate project costs accurately, considering materials, labor, equipment, and other factors involved in construction. 3. **Project Planning**: Develop skills in project planning and scheduling to ensure efficient execution of construction projects. 4. **Risk Assessment**: Learn to identify, assess, and mitigate risks associated with construction projects, such as environmental, safety, and financial risks. 5. **Cost Control**: Acquire knowledge and tools for effective cost control and management throughout the construction process to keep projects within budget. 6. **Sustainability and Regulations**: Understand the importance of sustainability in construction and how to comply with relevant regulations and codes in civil engineering projects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. **Estimation Skills**: Develop the ability to accurately estimate project costs. 2. **Construction Proficiency**: Acquire knowledge of various construction methods and techniques. 3. **Project Planning**: Demonstrate competence in project planning and scheduling. 4. **Risk Management**: Identify and mitigate risks associated with construction projects. 5. **Cost Control**: Effectively manage project costs to stay within budget. 6. **Compliance**: Understand and adhere to relevant regulations and sustainability principles in civil engineering projects. 7.

Indicative Contents المحتويات الإرشادية	1. **Introduction to Civil Engineering Construction**: o Overview of civil engineering projects o Role of construction in the field o Types of construction projects 2. **Construction Materials and Techniques**: o Properties and selection of construction materials o Various construction methods and techniques o Construction equipment and machinery 3. **Estimation and Costing**: o Estimation principles and techniques o Cost analysis for materials, labor, and equipment o Budgeting and cost control 4. **Project Planning and Scheduling**: o Project planning phases o Work breakdown structure (WBS) o Critical Path Method (CPM) and Gantt charts 5. **Risk Assessment and Management**: o Identifying construction project risks o Risk analysis and evaluation o Risk mitigation strategies 6. **Sustainability in Construction**: o Sustainable construction practices o Environmental considerations o Green building principles 7. **Regulatory Compliance**: o Building codes and regulations o Permits and approvals o Safety and quality standards 8. **Case Studies and Practical Applications**: o Real-world construction projects and their challenges o Analysis of successful and failed projects o Practical exercises and site visits 9. **Group Projects and Presentations**: o Collaborative construction project simulation o Presentation of project plans and estimates 10. **Assessment and Evaluation**: o Examinations, quizzes, and assignments o Evaluation of project planning and estimation skills 11. **Emerging Trends and Technologies**: o Introduction to modern construction technologies o Building Information Modeling (BIM) o 3D printing and automation in construction .

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Strategies for success in the Method of Construction and Estimation in Civil Engineering course include active participation in class, regular review of course materials, hands-on experience in construction projects, effective time management, and seeking assistance when needed from instructors or peers.

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Civil Engineering Construction
Week 2	Construction Materials and Techniques
Week 3	Estimation and Costing Fundamentals
Week 4	Project Planning and Scheduling
Week 5	Risk Assessment and Management
Week 6	Sustainable Construction Practices
Week 7	Regulatory Compliance and Codes
Week 8	Case Studies and Practical Applications
Week 9	Group Projects and Presentations
Week 10	Assessment and Evaluation
Week 11	Emerging Technologies in Construction
Week 12	Ethical Considerations in Civil Engineering
Week 13	
Week 14	
Week 15	
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	"Construction Management: A Professional Approach" by John S. Oakland	
Recommended Texts		
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Port Engineering**			**Module Delivery**	
Module Type	**Core**			**×Theory** **× Lecture** **☐ Lab** **× Tutorial** **☐ Practical** **☐ Seminar**	
Module Code	**CE415**				
ECTS Credits	**3**				
	75				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Civil Eng. Dept.		**College**	Iraq University College	
Module Leader	Dr. Abdul-Khaliq Mahmud HUSSAIN		**e-mail**	dr.eng.abdulkhaliq@gmail.com	
Module Leader's Acad. Title	Associated Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Abdul-Khaliq Mahmud HUSSAIN		**e-mail**	dr.eng.abdulkhaliq@gmail.com	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	25/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fluid Mechanics , Structure, Concrete, Hydraulic Structures	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Preparing and qualifying the civil engineers to meet the requirements of the labor market in the fields of Harbor, Ports and Coastal works in public and private sectors through diversifying the use of learning and teaching methods and training. Students can apply the acquired knowledge and skills to solve real problems of Harbor, Ports and Coastal engineering designs. 2. Presenting different designs of Harbor, Ports and Coastal engineering methods, both theoretical and practical, to comply with international standards of academic quality and meet the needs of the labor market. 3. Develop the knowledge and the method of scientific research in the field of Harbor, Ports and Coastal engineering in a way that contributes to developing the design method, managing Sea works. 4. Preparing a scientific basis with scientific development and to be ready for studying accurate topics in this specialty. 5. It serves the needs of the governmental and private sectors. 6. it provides creative and innovative design solutions at an affordable cost. 7. Its construction includes the production of a site plan, wave models, environmental impact
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Clarify the basic concepts of Harbor, Ports, Sea and Coastal engineering projects and their applications. 2. Acquisition of basic skills in the management of Harbor, Ports and Coastal systems. 3. Gaining experience in designing the Harbor, Ports and Coastal system and its suitability according to the different surrounding conditions. 4. Provide an overview of the analysis and design procedures used in the field of ocean, coastal and **harbor engineering**.
Indicative Contents المحتويات الإرشادية	8. Definition of Harbor, Ports, Sea and Coastal works ,usage and benefits of these projects [8 hrs.] 9. Types of Harbors, Ports, Sea and Coastal projects [8 hrs.] 10. Design of Harbor projects. [8 hrs.] 11. Design of Coastal projects. [8 hrs.] 12. Design of Sea projects. [8 hrs.] 13. Design of Ports projects. [8 hrs.] 14. Harbor Planning. Selection of site and planning of harbors, Ship characteristics, Characteristics of good. [8 hrs.] 15. Marine Structure [8 hrs.] 16. Docks and Repair Facilities [8 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in introducing this module is to encourage students to participate in the exercises, while at the same time improving and expanding their critical thinking skills. This will be achieved through classes and interactive tutorials and by thinking about the type of simple experiments that include some sampling activities that are of interest to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	32	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	43	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
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)	5, 10	LO# 1,2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO# 3,4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO# 5,8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO# 1 -7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basics of Ocean, Coastal and Harbor Engineering
Week 2	Port and Harbor Structures

Week 3	Coastal Planning
Week 4	Applications
Week 5	Marine Instrumentation
Week 6	Wave Hydrodynamics
Week 7	Applications
Week 8	Coastal Engineering and Design
Week 9	Port Planning and Management
Week 10	Coastal Hazards and Management
Week 11	Applications
Week 12	Port and Harbor Structures
Week 13	Marine Corrosion and Prevention
Week 14	Health, Safety and Environment Management
Week 15	Marine Pollution, Prevention and Control
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**1**-Harbour Engineering, The Dock and Harbor Engineer,s Reference Book, Second Edition Authors: Brysson Cunningham, 2011 2-Port and Harbor Engineering Edited By Adrian JarvisCopyright, 1998, 1st Edition 3- The Dock and Harbor Engineer's Reference Book by Brysson Cunningham | Oct 27, 2022 4-Coastal, Estuarial and Harbor Engineer's Reference Book 1st Edition	Yes

	by Michael B Abbott (Editor), W. Alan CPT 2022: Professional Edition 4th Edition	
Recommended Texts		No
Websites	Websites specialized in Harbor and Coastal engineering	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Steel structures design**			**Module Delivery**	
Module Type	**Core**			☐ **TheoryC √** ☐ **Lecture √** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CE412**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	4		**Semester of Delivery**	8	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Ghassan Nasir Ahmed		**e-mail**	Ghassan.ahmrd@iuc.edu.iq	
Module Leader's Acad. Title	Assistant lecturers		**Module Leader's Qualification**	MSc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	1- Mechanics of materials 2- Theory of structures	**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- Understanding steel as a structural material, and get knowledge of its mechanical properties. 2- Familiarity with design codes and standards. 3- Learning to identify and evaluate the various loads. 4- Acquiring the skills to design beams and plate girders 5- Design of tension members 6- Design of compression members. 7- Understanding the principles and techniques for designing steel connections
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the course, the students should have the necessary knowledge and skills to design safe and efficient steel structures in accordance with the applicable codes and standards. The acquired knowledge includes: 1- Properties of steel. 2- Information about the applicable code and standards. 3- Design of beams. 4- Plate girders. 5- Tension members. 6- Compression members. 7- Connections.
Indicative Contents المحتويات الإرشادية	1- Introduction to steel structures design. 2- Design of beams. 3- Plate girders 4- Tension members. 5- Compression members. 6- Connections.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategies for the course of steel structures design which will be employed are: 1- In-class lectures are used to illustrate the theoretical concepts, principles, and design methodologies related to steel structures. 2- Discussion: Encouraging class discussion enhances problem solving and collaboration among students. They can exchange ideas and learn from each other's. 3. Organizing field visits which can help students in linking the theoretical aspect to the practical aspects.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	92	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	108	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5,10	LO 1, 2, 4,and 5
	Assignments	2	10% (10)	2,12	LO 3, and 6
	Projects / Lab.	1	10% (10)	continuous	
	Report	1	10% (10)	13	LO 3, 4. And 6
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO 1 to 4
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction: Steel structures, properties of structural steel.
Week 2	Introduction: Design specifications, design methods, standard steel sections
Week 3	Design of beams: Laterally supported beams (design for bending and shear), web bearing and web buckling
Week 4	Design of beams: Laterally unsupported beams (design for bending and shear), beams subjected to biaxial bending

Week 5	Design of beams: Compound beams, deflection
Week 6	Plate girders: Design for bending, design of web
Week 7	Plate girder: Design of stiffeners
Week 8	Tension members: Tensile strength, effective section area
Week 9	Tension members: Built up tension members
Week 10	Compression members: Axially loaded compression members, built up columns
Week 11	Compression members: Members subjected to compression plus bending
Week 12	Compression members: Column base plate
Week 13	Connections: bolted connections
Week 14	Connections: bolted connections
Week 15	Connections: welded connections
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	AISC Steel construction manual/ American Institute of Steel Construction Structural steel design by McCormac and Csernak	No
Recommended Texts	Steel design by Segui	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	**Sanitary engineering**			**Module Delivery**	
Module Type	**Core**			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CE422				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	4		**Semester of Delivery**	8	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Murtada Mahdi Aljaberi		**e-mail**	Murtadamj89@gmail.com	
Module Leader's Acad. Title	Asst. lecturer		**Module Leader's Qualification**	Msc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fluid mechanics	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aim of this module is to learn the students how to; 1. compute the quantity of potable water, 2. recognize the materials used in piping works, 3. design water pumping stations, 4. design water treatment systems, 5. assess the environmental impact of untreated sewage discharge, 6. compute the quantity of sanitary sewage, 7. compute the quantity of storm water, 8. design sewer systems, 9. design sewage treatment systems, and 10. design sludge treatment systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of this module, students will be able to; 1. compute the quantity of potable water for a specific city, 2. select the appropriate piping material, 3. analyze and design water networks, 4. design water pumping stations, 5. design water treatment systems. 6. compute the quantity of sanitary sewage for a specific city, 7. compute the quantity of storm water, 8. design sanitary sewer system, 9. design storm sewer system, 10. design sewage treatment systems. 11. design sludge treatment systems
Indicative Contents المحتويات الإرشادية	**Part one: Water supply engineering** Water use, variations of water consumption rates, design period, population estimate, fire demand, ductile iron pipes, PVC pipes, steel pipes, concrete pipes, HDPE pipes, GRP pipes, flow in water pipelines, analysis of water networks using Hardy-Cross method, design of water networks, types of water pumping stations, types of pumps, power of pumping, system head curve, pump characteristics curves, pumps connection, pumps selection, water treatment, rapid mix unit, coagulation process, flocculation unit, sedimentation unit, filtration unit, disinfection unit **(56 hours).** **Part two: Sanitary sewage engineering** Sources of sewage, quantity of sanitary sewage, quantity of storm water, flow in sewers, manholes, catch basins, ventilation columns, partial flow diagram, design of sanitary sewer system, design of storm system, sanitary sewage treatment, screening unit, grit removal unit, primary sedimentation unit, biological treatment process, activated sludge system, trickling filters, secondary sedimentation unit, quantity of primary sludge, quantity of secondary sludge, gravity thickening unit, anaerobic digestion system, sludge dewatering using drying beds **(56 hours).**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This module will be adopted through different strategies like; in-class lectures and interactive tutorials, field data collection for nearby water and sewage projects, in-lab experiments, and photo and video presentations for existing water and sewage treatment equipment and systems.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	122	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	78	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	4	10% (10)	1, 4, 7, & 8	LO #1, 4, 5, & 7
	Assignments	4	10% (10)	3, 9, 10, and 14	LO #3, 8, 10, & 11
	Projects / Lab.	1	10% (10)	Continuous	
	Report	2	10% (10)	4, 11	LO#2 & 9
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	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	Quantity of water: Water use; variations in rates of water consumption; design period; population estimate; fire demand.
Week 2	Piping materials: Ductile iron piping works; PVC piping works; steel piping works; concrete piping works; HDPE piping works; GRP piping works; valves.
Week 3	Water distribution systems: Description of water distribution systems; analysis and design of water distribution systems.
Week 4	Water pumping stations: Types of pumping stations; types of pumps; pumps power; system head curve; pump characteristics curves; pumps connection; pumps selection.
Week 5	Water treatment: Aim of water treatment; description and design of Intake structure; description and design of rapid mix unit; coagulation process
Week 6	Water treatment: description and design of flocculation unit; sedimentation process; description and design of sedimentation unit
Week 7	Water treatment: description and design of filtration systems; description and design of disinfection systems.
Week 8	Mid-term Exam; Quantity of sanitary sewage and storm water
Week 9	Flow in sewers; Design of sewer systems
Week 10	Treatment of sanitary sewage: General introduction, flowsheet of a conventional sanitary sewage plant, description and design of screening unit
Week 11	Treatment of sanitary sewage: description and design of grit removal unit
Week 12	Treatment of sanitary sewage: description and design of primary sedimentation unit
Week 13	Treatment of sanitary sewage: description and design of biological treatment systems; description and design of secondary sedimentation unit
Week 14	Sludge treatment: Design and description of gravity thickening unit; design and description of anaerobic digestion unit; design and description of dewatering unit.
Week 15	A preparatory week before the final exam
Week 16	Final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Determination of pH; determination of turbidity.
Week 2	Determination of total, dissolved, and suspended solids.
Week 3	Jar test ; determination of total and free chlorine concentrations.
Week 4	Determination of EC; determination of watercolor; determination of dissolved oxygen.
Week 5	Determination of MLSS, MLVSS, and SVI.
Week 6	Determination of BOD and COD.
Week 7	Determination of nitrite, nitrate, sulfate, and phosphate.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	McGhee, T.J., "Water Supply and Sewage", 6th Ed., McGraw Hill, Tokyo, 1991.	Yes
Recommended Texts	Viessman, W., Hammer, M.J., Perez, E,M,, Chdik, P.A., Water supply and pollution control, 6th Ed., Pearson Education Limited 2014.	Yes

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	**Highway Engineering and Pavement Design**		**Module Delivery**		
Module Type	Core		☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**		
Module Code	CE419				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	4		**Semester of Delivery**	8	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	M.Sc. Iman Ali Talib		**e-mail**	iemantaleb93@gmail.com	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	**1.** The course aims to present the basic elements of geometric design for highways and deals with the dimensions and layout of visible features of the highway. The features normally considered are the cross-section elements, sight distance consideration, horizontal curvature, gradients, and intersection. **2.** The course aims to present the basic element for designing the pavement (flexible & Rigid) also analyze all stresses and applied loads on the pavement and take into consideration choosing the materials used in the pavement construction
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1.** Gives us an idea about the roads of ancient times. **2.** The emphasis of the geometric design is to address the requirement of the driver and the vehicle such as safety, comfort, efficiency, etc. **3.** The characteristics of cross-sectional elements are important in highway geometric design because they influence safety and comfort. **4.** Horizontal alignment is one of the most important features influencing the efficiency and safety of a highway. **5.** Knowledge and Understanding of highway design features. **6.** Bituminous materials, Natural Asphalt, constituents of asphalt cement, and test of asphalt. **7.** The emphasis of the different aggregate characteristics with size and gradation, and methods of blending for dry mix design. **8.** Bituminous mix design, with the objective of mix design. **9.** Study of stress distribution through the pavement with the calculation of flexible pavement stresses and deflections. **10.** Knowledge and Understanding of pavement design and analysis
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following:** **Part A – Highway Engineering** - Proper design of a horizontal curve, including elements within a single curve and consistency of curvature along a

	highway. - Design speed is the single most important factor that affects the geometric design. - Derive and evaluate the information needed to apply engineering analysis methods to unfamiliar problems. - Soil stabilization methods and classification. - Highway Drainage and Design Equation **Part B – Pavement Design and Analysis** - Study of stress distribution through the pavement with the calculation of flexible pavement stresses and deflections. - Flexible pavement design methods (CBR method and AASHTO Design method). - Rigid pavement types and types of joints in the rigid pavement, and temperature stresses.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Scientific and research skills are developed through teaching and learning activities. Analysis and design-solving skills are further developed by employing a set of problems prepared by the lecturers in small study groups and all work submitted is evaluated and responded to.

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	5.5
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)		
	Assignments	2	10% (10)		
	Projects / Lab.	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	Midterm Exam	2hr	10% (10)		
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	History of Highway Engineering, Factors affecting geometric design
Week 2	Road classification, Cross-Sectional Elem
Week 3	Highway Location and survey, Horizontal alignment I, Analysis of super-elevation
Week 4	Extra Widening, Horizontal Curve Fundamentals, Reverse, compound, and Spiral curves
Week 5	Sight Distance on Horizontal Curve, Vertical Alignment, Parabolic Formula
Week 6	Stabilized Bases & Subbases, Earthworks & Subgrades, Control of Embankment Construction
Week 7	Highway Drainage, Surface Drainage System Design
Week 8	Bituminous Materials, Test for Asphalt
Week 9	Aggregate, Physical Properties of Aggregate, Methods of Blending
Week 10	Bituminous Mix Design, Marshal Mix Design
Week 11	Stress distribution through the pavement, Calculation of stresses and deflections
Week 12	Design Introduction to Pavement, Types of Pavements, CBR Design Method
Week 13	Flexible pavement design methods, AASHTO Design Methods
Week 14	Rigid Pavement, Rigid Pavement Types, Types of Joints in Rigid Pavement
Week 15	Rigid Pavement, Critical load position, Temperature Stresses
Week 16	**The preparatory week before the Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	California Bearing Ratio CBR Test
Week 2	Bitumen Penetration Test
Week 3	Bitumen Softening Test
Week 4	Specific Gravity Test of Bitumen
Week 5	Bitumen Ductility Tests
Week 6	Viscosity Test of Bitumen, Flash Point Tests of Bitumen
Week 7	Marshall Tests

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	▪ 1-Handbook: The Handbook of Highway Engineering. By ▪ T.F. Fwa.2006. 2. Handbook: Highway Engineering ▪ Handbook. By Roger.L.b.and Kenneth J. 2nd.ed. 2004.	Yes
Recommended Texts	▪ Handbook of Transportation Engineering. By Myer ▪ Kutz.2004.	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	**Hydraulic Engineering**			**Module Delivery**	
Module Type	**C**			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CE413				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	4		**Semester of Delivery**	8	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Lecturer Angham Ali Mohammed		**e-mail**	Angham.19911993@gmail.com	
Module Leader's Acad. Title			**Module Leader's Qualification**	MS.C	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	29/07/2023		**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 study and design the different types of hydraulic structures. 2-Understand the causes of failure of the hydraulic structures and its solutions. 3-To choose a suitable hydraulic structure in the project.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Discuss the types of hydraulic structures according to its purposes. 2- Discuss the causes of failure of hydraulic structures . 3- Explain the different methods of floor design of the hydraulic structures. 4- Define and explain of the energy dissipation structures. 5- Define and design of stilling basins. 6- Explain and design of different types of culverts. 7- Discuss and design of pipe aqueduct and flume. 8- Define and design of siphon. 9- Study and design a steel vertical gate.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: 1-Types the hydraulic structures , causes of failure and design of floor . (16 hrs) 2-Design of regulator and stilling basin with hydraulic jump . (12 hrs) 3-Design of crossing hydraulic structures .(16 hrs) 4- Study the sliding gates and its design. (6 hrs) 5-Revision problem classes. (6hrs).

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Participation in the activities and solving an issue in class to broaden thinking abilities.

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	38	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
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)	4 , 9	All
	Assignments	2	10% (10)	2,4,6,8,10,12	All
	Projects/Lab.	0	0% (0)		
	Report	1	10% (10)	13	
Summative assessment	Midterm Exam	2 hr	10% (10)	7	1-6
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction , types of hydraulic structures .
Week 2	2 Steps for design of hydraulic structures , site conditions.
Week 3	Causes of failure of hydraulic structures, Bligh's creep theory.
Week 4	Lane's weighted creep theory
Week 5	Khosla 's theory.
Week 6	Solved problems of pervious methods
Week 7	Hydraulic design of regulators.
Week 8	Solved problems about design of the regulators.
Week 9	Hydraulic jump and solved problems.
Week 10	Design of vertical drop.
Week 11	Design of stilling basins.
Week 12	Design of pipes and box culverts.
Week 13	Design of pipe aqueduct and flume.
Week 14	Design of siphon .
Week 15	Design of sliding steel gates .
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1-Irrigation , water power and water resources engineering. By Arora (2007) 2-Hydrulic structures by (Novak) (2007)	No
Recommended Texts	Theory and design of Irrigation structures . By (Gupta).	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	**Engineering project**			**Module Delivery**	
Module Type	**Core**			☐ **Lecture** √ **Lab** ☐ **Tutorial** √ **Practical** ☐ **Seminar**	
Module Code	**CE420**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	4		**Semester of Delivery**	8	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	**- التأكد من قدرات الطالب الخريج على استثمار ما امتلكه من البنى المعرفية والقدرات الكتابية والبحثية والتوثيقية خلال مرحلة دراسته.** **- منح الطالب الخريج فرصة ليطبق ما تعلمه وتنفيذه في الميدان الحيوي لتخصصه.** **ترسيخ قيمة الأمانة العلمية في البحث والكتابة البحثية خلال مراحل توثيق وكتابة تقرير البحث.** **- توفير فرصة للطالب الخريج للعمل التعاوني في حال عمل في إطار فريق** **- تعزيز المنظومة القيمية والمهارية للطالب من خلال تمكينه من الاختيار، والتطبيق، والبحث، والاستنتاج، والتحليل والالتزام بقيم الأمانة العلمية والقيم الأخلاقية للبحث العلمي.**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	– **اختيار موضوع المشروع أو المشكلة ووضع عنوان مناسب له** – **بناء خطة مشروع التخرج** – **جمع المعلومات وتحليلها** – **تفسير النتائج** – **التوثيق على شكل تقرير**
Indicative Contents المحتويات الإرشادية	**لكي تكون المشكلة التي يتم اختيارها مهمة وسهلة البحث لا بد من اتباع ما يلي:** **- البحث عن مشكلة من ميدان التخصص** **- الابتعاد عن المشاكل المطروحة باستمرار** **- التأكد من أن المشكلة مهمة وأن لحلها عائدات إيجابية** **- اقتناع المشرف بأن المشكلة حيوية وقابلة للبحث.**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**الاستراتيجية التي يفضل اعتمادها هي أن يكون موضوع البحث نابعا من ما يلي:** **أ. محيط العمل والخبرة العلمية:** **ب. القراءات الواسعة الناقدة لما تحويه الكتب والدوريات والصحف** **ج. البحوث السابقة** **د. تكلفة من جهة ما**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	58	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
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**	-----	----		
	Assignments	-----	----		
	Projects / Lab.	1	40% (40)		
	Report	1	30% (30)		
Summative assessment	**Midterm Exam**	-----	----		
	Final Exam	2hr	30% (30)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**اختيار موضوع المشروع أو المشكلة ووضع عنوان مناسب له**
Week 2	**بناء خطة المشروع**
Week 3	**جمع المعلومات وتحليلها**
Week 4	**جمع المعلومات وتحليلها**
Week 5	**جمع المعلومات وتحليلها**
Week 6	**جمع المعلومات وتحليلها**
Week 7	**جمع المعلومات وتحليلها**
Week 8	**جمع المعلومات وتحليلها**

Week 9	**جمع المعلومات وتحليلها**
Week 10	**جمع المعلومات وتحليلها**
Week 11	**تفسير النتائج**
Week 12	**تفسير النتائج**
Week 13	**التوثيق على شكل تقرير**
Week 14	**التوثيق على شكل تقرير**
Week 15	**التوثيق على شكل تقرير**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	تعتمد على موضوع المشروع الهندسي المقترح
Week 2	تعتمد على موضوع المشروع الهندسي المقترح
Week 3	تعتمد على موضوع المشروع الهندسي المقترح
Week 4	تعتمد على موضوع المشروع الهندسي المقترح
Week 5	تعتمد على موضوع المشروع الهندسي المقترح
Week 6	تعتمد على موضوع المشروع الهندسي المقترح
Week 7	تعتمد على موضوع المشروع الهندسي المقترح

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	تعتمد على موضوع المشروع الهندسي المقترح	
Recommended Texts	تعتمد على موضوع المشروع الهندسي المقترح	
Websites	تعتمد على موضوع المشروع الهندسي المقترح	

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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	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.