Ministry of Higher Education
and Scientific Research
University of Babylon
College of Engineering
Department of Environmental Engineering

Academic Program

and Course Description

for the B.Sc. in Environmental Engineering Program

2025

Introduction:

The Bachelor of Science in Environmental Engineering program is one of the core academic programs at the College of Engineering, University of Babylon. The program aims to prepare graduates capable of analyzing environmental problems and developing sustainable solutions, by integrating engineering knowledge with environmental understanding, in line with modern scientific developments and national development requirements.

The program lasts four years and follows a coursework system. Students graduate after completing eight courses, along with summer internship requirements and a final graduation project. This enhances their practical skills and helps them gain a deeper understanding of practical aspects.

The program strives to keep pace with developments in the field of environmental engineering through continuous curriculum development in line with the labor market and global developments in engineering education. Furthermore, the Bachelor of Science in Environmental Engineering program enhances students' capabilities in various fields, including water and wastewater treatment, air quality, waste management, sustainable energy technologies, and environmental assessment.

It also promotes professional and ethical values and encourages creativity and community service. Graduates of the program can work in various fields within the public and private sectors, such as ministries concerned with the environment and water resources, municipalities, regulatory bodies, consulting and contracting firms, environmental laboratories, as well as research centers and infrastructure and sustainable development projects.

Academic Program Description

University Name	University of Babylon
Faculty/Institute	College of Engineering
Scientific Department	Department of Environmental Engineering
Academic or Professional Program Name	B.Sc. in Environmental Engineering Program
Final Certificate Name	in Environmental Engineering BSC
Academic System	(The first stage to the second stage- Bologna Information System)
Description Preparation Date	1/9/2025
File Completion Date	1/9/2025

Signature:
Asst. prof. Dr. Ali Jalil Chabuk
Head of Department
Date:

Signature:
prof. Dr. Ali Hasson Nahhab
Scientific Associate
Date:

The file is checked by:
Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Name: Asst. prof. Dr. Zainab Ali Omran
Date:
Signature:

Approval of the Dean

1. Program Vision

The Bachelor of Environmental Engineering program contributes to sustainable development, environmental protection, and environmental research, and provides innovative solutions to address the most pressing global environmental challenges.

2. Program Mission

The Bachelor of Environmental Engineering program is committed to preparing scientifically and professionally qualified environmental engineers who possess the knowledge and skills necessary to diagnose environmental problems and develop sustainable solutions. This is achieved through an advanced educational environment, the encouragement of scientific research, and the building of effective partnerships with the community and relevant institutions.

3. Program Objectives

- Qualifying graduates with solid scientific and engineering knowledge in the fields of environmental engineering**.**
- Enabling graduates to work effectively within multidisciplinary teams in the public and private sectors**.**
- Enhancing the ability to think and solve environmental problems based on scientific and professional foundations**.**
- Supporting scientific research and continuously updating curricula to keep pace with advances in the fields of environment and engineering**.**
- Instilling ethical values and social responsibility among graduates, encouraging them to contribute to environmental protection and achieving sustainable development goals.

4. Program Accreditation

The accredited program is the Accreditation Board for Engineering and Technology (ABET). However, it does not have program accreditation.

5. Other external influences

Training courses for students to develop their professional skills / field visits / summer training.

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	**Bologna system = 3** **Semester system = 0**	**Bologna system = 6** **Semester system = 0**	**%5.7** **%0**	**Basic**
College Requirements	**0**	**0**	**0%**	
Departments Requirements	**Bologna system = 50** **Semester system= 63**	**Bologna system = 234** **Semester system = 148**	**%94.3** **%100**	**Basic**
Summer Training	**1**	**0**	**0%**	**Basic**
Other	**0**	**0**	**0%**	

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours		
			Theoretical	Tutorial	Practical
First-year First-semester	**UOBAB0105011**	**Mathematics I**	**4**	**1**	**0**
	UOBAB0105012	**Engineering Mechanics I**	**4**	**1**	**0**
	UOBABb4	**Computer Programming I**	**1**	**0**	**2**
	UOBAB0105014	**Engineering and Auto Cad Drawing I**	**2**	**0**	**4**
	UOBAB0105015	**Microbiology**	**2**	**0**	**2**

	UOBABb3	Democracy and human rights	2	0	0
	UOBABb1	English Language I	2	0	0
First-year Second-semester	UOBAB0105021	Mathematics II	4	1	0
	UOBAB0105022	Engineering Mechanics II	4	1	0
	UOBAB0105023	Computer Programming II	1	0	2
	UOBAB0105024	Engineering and Auto Cad Drawing II	2	0	4
	UOBABb2	Arabic Language	2	0	0
	UOBAB0105026	Introduction to Environmental Engineering	2	0	0
	UOBAB0105025	Engineering Geology	2	1	0
Second-year First-semester	ENV2301	Mathematics III	3	1	0
	ENV2302	Strength of Materials I	3	1	0
	ENV2303	Fluid Mechanics I	2	1	2
	ENV2304	Engineering Surveying	2	1	2
	ENV2305	Environmental Protection I	2	2	0
	ENV2306	Engineering Statistics	2	2	0
	UOBAB2001	Arabic Language II	2	0	0
	UOBAB2301	Crimes of the defunct Baath Party	2	0	0
Second year Second semester	ENV2401	Mathematics IV	3	1	0
	ENV2402	Strength of Materials II	3	1	0
	ENV2403	Fluid Mechanics II	2	1	2
	ENV2404	Environmental Protection II	2	1	0
	ENV2405	Material and Building Construction	2	1	2
	ENV2406	Chemistry	2	0	2
	UOBAB2004	Computer II	1	0	2
	UOBAB2302	English Language II	1	1	0
Third-year First-semester	En Ee Ea 3 33 1	Engineering Analysis	2	2	0
	En Ee Dcc 3 34 2	Design of Concrete Construction	2	1	0
	En Ee We 3 35 3	Water Engineering I	2	1	2
	En Ee Swm 3 36 4	Solid Waste Management	3	1	0
	En Ee Pd 3 37 5	Plumbing and Drainage I	2	1	0
	En Ee Em 3 38 6	Engineering Management	2	1	0
	En Ee Spc 3 39 7	Soil Pollution Control	2	0	2
	En Ee EL 3 40 8	English Language V	1	1	0
Third-year Second-semester	En Ee Nm 3 41 9	Numerical Methods	2	2	0
	En Ee Ts 3 42 10	Theory of Structures	2	1	0
	En Ee We 3 43 11	Water Engineering II	2	1	2
	En Ee Hwm 3 44 12	Hazardous Waste Management	3	1	0
	En Ee Pd 3 45 13	Plumbing and Drainage II	2	1	0
	En Ee Ec 3 46 14	Engineering Economy	2	1	0
	En Ee Eh 3 47 15	Engineering Hydrology	2	1	0
	En Ee EL 3 28 16	English Language VI	1	1	0
Fourth year First semester	En Ee Wre 4 49 1	Water Resources Engineering	2	1	0
	En Ee Apc 4 50 2	Air Pollution Control	2	1	2
	En Ee Wwe 4 51 3	Wastewater Engineering I	2	1	2
	En Ee Ipc 4 52 4	Industrial Pollution Control	3	1	0
	En Ee Dwdns 4 53 5	Design of Water Distribution Network Systems	2	1	0
	En Ee Ea 4 54 6	Environment and Architecture I	2	1	0
	En Ee Gp 4 55 7	Graduation Project	1	1	2
	En Ee EL 4 56 8	English Language VII	1	1	0
Fourth year Second semester	En Ee Hse 4 57 9	Hydraulic Structures Engineering	2	1	0
	En Ee Npc 4 58 10	Noise Pollution Control	2	1	2
	En Ee Wwe 4 59 11	Wastewater Engineering II	2	1	2
	En Ee En 4 60 12	Environmental Management	2	1	0
	En Ee Dwwcns 4 61 13	Design of Wastewater Collection Network Systems	2	1	0
	En Ee Ea 4 62 14	Environment and Architecture II	2	1	0
	En Ee EL 4 63 15	English Language VIII	1	1	0
	En Ee Gp 4 55 7	Graduation Project	1	1	2

8. Expected learning outcomes of the program

Knowledge

A1: Ability to apply advanced mathematical, scientific, and engineering principles to identify, formulate, and solve complex environmental engineering problems.

Skills

B1: Ability to design and conduct experiments, as well as analyze and interpret data, to provide innovative solutions to environmental challenges.
B2: Ability to communicate effectively, both orally and in writing, to technical and non-technical audiences.
B3: Ability to function effectively as members or leaders of multidisciplinary teams to address environmental issues.

Ethics

C1: Ability to identify, evaluate, and incorporate the latest technologies, policies, and best practices in the field of environmental engineering.
C2: Ability to recognize and address the ethical, societal, and environmental implications of their professional activities.
C3: Ability to engage in lifelong learning and professional development to stay current with the evolving demands of the environmental engineering profession.

9. Teaching and Learning Strategies

Teaching Strategies

- Interactive theoretical lectures
- Use of multimedia and presentations
- Field visits and practical experiments
- Brainstorming
- Seminars and discussion groups

Learning Strategies

- Self-learning through reading, individual research, and summarizing modern scientific sources.
- Practical laboratory experiments and self-analysis of results.
- Online learning
- Brainstorming and homework

10. Evaluation methods

1-Exams
2-Discussing projects
3- Summer Training
4- Practical exams

11. Faculty

Faculty Members						
No.	Academic Rank	Specialization		Special requirements /skills (if applicable)	Teaching staff	
		General	Special		Staff	Lecturer
1	Asst. Prof. Dr. Ali Jalil Chabuk	Civil Engineering	Environmental Engineering		Staff	
2	Prof. Dr. Alaa Hussien Wadi	Civil Engineering	Environmental Engineering		staff	
3	Prof. Dr. Amal Hamza Khalil	Civil Engineering	Environmental Engineering		Staff	
4	Prof. Rasha Salah Mahdi	Civil Engineering	Environmental Engineering		Staff	
5	Prof. Dr. Nisren Jasim Hussien Al-Mansori	Construction Engineering	Water Resources Engineering		Staff	
6	Prof. Dr. Isra'a Sadi Samaka	Civil Engineering	Environmental Engineering		Staff	
7	Prof. Dr. Nabaa Shakir Hadi	Construction Engineering and Education	Environmental Engineering/Water Pollution Control		Staff	
8	Prof. Dr. Hussein A. M. Al-Zubaidi	Civil Engineering	Environmental Engineering		Staff	
9	Prof. Dr. Khalid Safaa Hashim	Civil Engineering	Environmental Engineering		Staff	
10	Prof. Dr. Zaid Ali Hasn	Civil Engineering	Construction Material Engineering		Staff	
11	Asst. Prof. Dr. Wissam Al-Taliby	Civil Engineering	Environmental Engineering		Staff	
12	Asst. Prof. Dr. Rawaa Al-Isawi	Civil Engineering	Environmental Engineering		Staff	
13	Asst. Prof. Dr. Intidhar Jabir Idan	Civil Engineering	Environmental Engineering		Staff	
14	Asst. Prof. Dr. Fatimah Fahem Alkhafaji	Civil Engineering	Roads and Transportation Engineering		Staff	
15	Asst. Prof. Dr. Udai A Jahad	Water Resources Engineering	Water Resources Engineering		Staff	
16	Asst. Prof. Dr. Sherin Qasim	Civil Engineering	Construction		Staff	

	Abdul Radh		**Engineering**			
17	**Lec. Dr. Hussein Hamid Emran**	**Civil Engineering**	**Environmental Engineering**		**Staff**	
18	**Lec. Dr. Salam Razaq**	**Civil Engineering**	**Construction Material Engineering**		**Staff**	
19	**Lec. Dr. Ali Abdul Hussein**	**Civil Engineering**	**Construction Engineering**		**Staff**	
20	**Lec. Dr. Waleed Ali Hasan**	**Civil Engineering**	**Construction Engineering**		**Staff**	
21	**Lec. Dr. Wathiq Jasim AlJabban**	**Civil Engineering**	**Geotechnical Engineering**		**Staff**	
22	**Asst. Prof. Afrah Abood Hasan**	**Civil Engineering**	**Environmental Engineering**		**Staff**	
23	**Lec. Ahmed Talib Sahib**	**Civil Engineering**	**Environmental Engineering**		**Staff**	
24	**Lec. Rand Sami**	**Civil Engineering**	**Water Resources Engineering**		**Staff**	
25	**Asst. Lec. Mustafa Abdul-Kareem**	**Civil Engineering**	**Environmental Engineering**		**Staff**	
26	**Asst. Lec. Fatimah Al-Zahraa Kareem**	**Environmental Sciences**	**Environmental Sciences**		**Staff**	
27	**Asst. Lec. Issra Hussien Ali**	**Civil Engineering**	**Construction Engineering**		**Staff**	
28	**Asst. Lec. Hussien Ali Hussien**	**Civil Engineering**	**Sanitary Engineering**			**Lecturer**
29	**Asst. Prof. Dr. Safaa Abdel Wahid Abboud**	**Faculty of Law**	**Faculty of Law**			**Lecturer**
30	**Asst. Lec. Rabab Naji Abdel Attia**	**Faculty of Law**	**Faculty of Law**			**Lecturer**
32	**Asst. Lec. Hiba Mohammed**	**Arabic Language**	**Etiquette**			**Lecturer**
33	**Asst. Lec. Noor Ahmed**	**English Education**	**English Language**			**Lecturer**
34	**Asst. Lec. Amer kazem Mohammed**	**Arabic Language**	**Etiquette**			**Lecturer**

Professional Development

Monitoring new Faculty members

New faculty members are oriented by familiarizing them with the laws related to them, such as the Civil Service Code and the University Service Code, so that they can fully understand their duties and responsibilities. They are also encouraged to engage with their teaching colleagues through seminars, lectures, and various activities that enhance the experience of new faculty members and help establish a solid foundation between them and their former teaching colleagues, as the goal is one: to serve the educational institution and strengthen the bonds of cooperation and development among them.

Professional Development of Faculty members

Professional development includes holding annual courses and seminars on various aspects of environmental engineering to ensure information exchange, in addition to participating in scientific conferences inside and outside the university or abroad to learn about the most important developments that keep pace with the engineering aspect and advanced teaching methods in universities, transferring them and benefiting from scientific experiences to develop the intellectual structures of students and teachers.

12. Acceptance Criterion

Central

13. The most important sources of information about the program

- **The college and university website**
- **University guide**
- **The most important books and resources for the department**

14. Program Development Plan

The Bachelor of Environmental Engineering program aims to graduate competent engineers specializing in environmental engineering, according to the latest internationally accredited curricula. The goal is to implement various engineering projects currently needed by the country. This will be achieved by providing a high-quality engineering, educational, and research environment in this field, enabling them to build and serve their country. It will also highlight the role of environmental engineers in serving their country, contributing to civilizational development, and promoting scientific progress.

Program skills outline

Year/ Level	Course Code	Course Name	Basic or optional	Required program Learning outcomes						
				Knowledge	Skills			Ethics		
				A1	B1	B2	B3	C1	C2	C3
First-year / First-semester	UOBAB0105011	Mathematics I	Basic	✔	✔			✔		
First-year / First-semester	UOBAB0105012	Engineering Mechanics I	Basic	✔	✔	✔	✔	✔	✔	✔
First-year / First-semester	UOBABb4	Computer Programming I	Basic	✔	✔			✔		
First-year / First-semester	UOBAB0105014	Engineering and Auto Cad Drawing I	Basic	✔	✔	✔	✔	✔	✔	✔
First-year / First-semester	UOBAB0105015	Microbiology	Basic	✔	✔			✔		
First-year / First-semester	UOBABb3	Democracy and human rights	Basic			✔	✔		✔	
First-year / First-semester	UOBABb1	English Language I	Basic			✔	✔		✔	
First-year / Second-semester	UOBAB0105021	Mathematics II	Basic	✔	✔			✔		
First-year / Second-semester	UOBAB0105022	Engineering Mechanics II	Basic	✔	✔	✔	✔	✔	✔	✔
First-year / Second-semester	UOBAB0105023	Computer Programming II	Basic	✔	✔			✔		
First-year / Second-semester	UOBAB0105024	Engineering and Auto Cad Drawing II	Basic	✔	✔	✔	✔	✔	✔	✔
First-year / Second-semester	UOBABb2	Arabic Language	Basic			✔	✔		✔	
First-year / Second-semester	UOBAB0105026	Introduction to Environmental Engineering	Basic	✔	✔	✔	✔	✔	✔	✔
First-year / Second-semester	UOBAB0105025	Engineering Geology	Basic	✔	✔	✔	✔	✔	✔	✔
Second-year / First-semester	En Ee Ma 2 17 1	Mathematics III	Basic	✔	✔			✔		
Second-year / First-semester	En Ee Sm 2 18 2	Strength of Materials I	Basic	✔	✔	✔	✔	✔	✔	✔
Second-year / First-semester	En Ee Cp 2 19 3	Computer Programming III	Basic	✔	✔	✔	✔	✔	✔	✔
Second-year / First-semester	En Ee Fm 2 20 4	Fluid Mechanics I	Basic	✔	✔	✔	✔	✔	✔	✔
Second-year / First-semester	En Ee Ep 2 21 5	Environmental Protection I	Basic	✔	✔	✔	✔	✔	✔	✔
Second-year / First-semester	En Ee Es 2 22 6	Engineering Surveying I	Basic	✔	✔	✔	✔	✔	✔	✔
Second-year / First-semester	En Ee Bm 2 23 7	Building Materials	Basic	✔	✔	✔	✔	✔	✔	✔
Second-year / First-semester	En Ee EL 2 24 8	English Language III	Basic			✔	✔		✔	
Second year / Second semester	En Ee Ma 2 25 9	Mathematics IV	Basic	✔	✔			✔		
Second year / Second semester	En Ee Sm 2 26 10	Strength of Materials II	Basic	✔	✔	✔	✔	✔	✔	✔
Second year / Second semester	En Ee Fm 2 27 11	Fluid Mechanics II	Basic	✔	✔	✔	✔	✔	✔	✔
Second year / Second semester	En Ee Ep 2 28 12	Environmental Protection II	Basic	✔	✔	✔	✔	✔	✔	✔
Second year / Second semester	En Ee Es 2 29 13	Engineering Surveying II	Basic	✔	✔	✔	✔	✔	✔	✔
Second year / Second semester	En Ee Es 2 30 14	Engineering Statistics	Basic	✔	✔	✔	✔	✔	✔	✔
Second year / Second semester	En Ee Bc 2 31 15	Building Construction	Basic	✔	✔	✔	✔	✔	✔	✔
Second year / Second semester	En Ee EL 2 32 16	English Language IV	Basic			✔	✔		✔	
Third-year / First-semester	En Ee Ea 3 33 1	Engineering Analysis	Basic	✔	✔	✔	✔	✔	✔	✔

Third-year / First-semester	En Ee Dcc 3 34 2	Design of Concrete Construction	Basic	✔	✔	✔	✔	✔	✔	✔
Third-year / First-semester	En Ee We 3 35 3	Water Engineering I	Basic	✔	✔	✔	✔	✔	✔	✔
Third-year / First-semester	En Ee Swm 3 36 4	Solid Waste Management	Basic	✔	✔	✔	✔	✔	✔	✔
Third-year / First-semester	En Ee Pd 3 37 5	Plumbing and Drainage I	Basic	✔	✔	✔	✔	✔	✔	✔
Third-year / First-semester	En Ee Em 3 38 6	Engineering Management	Basic	✔	✔	✔	✔	✔	✔	✔
Third-year / First-semester	En Ee Spc 3 39 7	Soil Pollution Control	Basic	✔	✔	✔	✔	✔	✔	✔
Third-year / First-semester	En Ee EL 3 40 8	English Language V	Basic			✔	✔		✔	
Third-year / Second-semester	En Ee Nm 3 41 9	Numerical Methods	Basic	✔	✔			✔		
Third-year / Second-semester	En Ee Ts 3 42 10	Theory of Structures	Basic	✔	✔	✔	✔	✔	✔	✔
Third-year / Second-semester	En Ee We 3 43 11	Water Engineering II	Basic	✔	✔	✔	✔	✔	✔	✔
Third-year / Second-semester	En Ee Hwm 3 44 12	Hazardous Waste Management	Basic	✔	✔	✔	✔	✔	✔	✔
Third-year / Second-semester	En Ee Pd 3 45 13	Plumbing and Drainage II	Basic	✔	✔	✔	✔	✔	✔	✔
Third-year / Second-semester	En Ee Ec 3 46 14	Engineering Economy	Basic	✔	✔			✔		
Third-year / Second-semester	En Ee Eh 3 47 15	Engineering Hydrology	Basic	✔	✔	✔	✔	✔	✔	✔
Third-year / Second-semester	En Ee EL 3 28 16	English Language VI	Basic			✔	✔		✔	
Fourth year / First semester	En Ee Wre 4 49 1	Water Resources Engineering	Basic	✔	✔	✔	✔	✔	✔	✔
Fourth year / First semester	En Ee Apc 4 50 2	Air Pollution Control	Basic	✔	✔	✔	✔	✔	✔	✔
Fourth year / First semester	En Ee Wwe 4 51 3	Wastewater Engineering I	Basic	✔	✔	✔	✔	✔	✔	✔
Fourth year / First semester	En Ee Ipc 4 52 4	Industrial Pollution Control	Basic	✔	✔	✔	✔	✔	✔	✔
Fourth year / First semester	En Ee Dwdns 4 53 5	Design of Water Distribution Network Systems	Basic	✔	✔	✔	✔	✔	✔	✔
Fourth year / First semester	En Ee Ea 4 54 6	Environment and Architecture I	Basic	✔	✔	✔	✔	✔	✔	✔
Fourth year / First semester	En Ee Gp 4 55 7	Graduation Project	Basic	✔	✔	✔	✔	✔	✔	✔
Fourth year / First semester	En Ee EL 4 56 8	English Language VII	Basic			✔	✔		✔	
Fourth year / Second semester	En Ee Hse 4 57 9	Hydraulic Structures Engineering	Basic	✔	✔	✔	✔	✔	✔	✔
Fourth year / Second semester	En Ee Npc 4 58 10	Noise Pollution Control	Basic	✔	✔	✔	✔	✔	✔	✔
Fourth year / Second semester	En Ee Wwe 4 59 11	Wastewater Engineering II	Basic	✔	✔	✔	✔	✔	✔	✔
Fourth year / Second semester	En Ee En 4 60 12	Environmental Management	Basic	✔	✔	✔	✔	✔	✔	✔
Fourth year / Second semester	En Ee Dwwcns 4 61 13	Design of Wastewater Collection Network Systems	Basic	✔	✔	✔	✔	✔	✔	✔
Fourth year / Second semester	En Ee Ea 4 62 14	Environment and Architecture II	Basic	✔	✔	✔	✔	✔	✔	✔
Fourth year / Second semester	En Ee EL 4 63 15	English Language VIII	Basic			✔	✔		✔	
Fourth year / Second semester	En Ee Gp 4 55 7	Graduation Project	Basic	✔	✔	✔	✔	✔	✔	✔

- **Please tick the boxes corresponding to the individual program learning outcomes under evaluation**

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics I**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**UOBAB0105011**			☒ **Lecture**	
ECTS Credits	**6**			☐ **Lab**	
SWL (hr/sem)	**150**			☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	1	**Semester of Delivery**	1		
Administering Department	Type Dept. Code	**College**	Type College Code		
Module Leader	Dr. Zaid Ali Hasan	**e-mail**	zaid.hasan.bib@atu.edu.iq		
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	**1/9/2024**	**Version Number**	1.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The first principal goal of this module is to help students be familiar with the different types of functions and how to find domain and range. They will also be dealing with the basic concept of functions and their graphs. 2. The second primary goal of this course is to familiarize the students with the basic concept of Trigonometric functions, Inverse functions and the basic concept of Limits and continuity of functions. 3. The third goal is to understand the basic concept of function derivatives, velocity speed and other rates of change. As well as the basic concept of derivative of the trigonometric functions chain rule, implicit differentiation, linear approximation and the application of derivatives.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students will be able to: 1. Students learn to Interpret and evaluate quantitative or symbolic models such as graphs, tables, units of measurement, and distributions. In Limits, student able to read limits from graphs, compute them from tables and from algebraic formulas of functions. Continuity is taught by interpreting graphs of functions and analytically by using limit definition of continuity. The Derivative is introduced as a rate of change and as a graphical representation of the slope of the tangent line of the graph of a function. 2. Students will be able to perform algebraic computations and obtain solutions using equations and formulas. 3. Students learn Limits using graphs of functions and by algebraic computations. Continuity is taught by interpreting graphs of functions and analytically by using limit definitions of continuity. 4. Students learn to use mathematical thinking to solve various problems such as maximizing the volume of a box or a cone with a fixed surface area. 5. Demonstrate an intuitive and computational understanding for partial derivative and its applications by solving a variety of problems such as computing velocity and acceleration.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A – functions** Algebraic functions, trigonometric function, domain and range for various types of function, absolute values, even, odd function, integer functions. Also, students will be able to graph the various types of functions [24 hrs.] **Part B – Limit and continuity** Read limits from graphs, compute them from tables and from algebraic formulas of functions. Continuity is taught by interpreting graphs of functions and analytically by using limit definition of continuity. [20 hrs.] **Part C – Partial Derivatives** Partial derivatives of function of two variables; Partial derivatives of function of more than two variables; The Chain rule; extreme points. [16 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم			
Strategies	This course is taught as a lecture course with student participation. Classroom lectures are held to illustrate concepts. Student assignments are used to enhance concepts.		
Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	Projects / Lab.	2	10% (10)	Continuous	
	Report	1	10% (10)	13	~~LO # 5, 8 and 10~~
Summative	**Midterm Exam**	2 hr	10% (20)	7	~~LO # 1-7~~

assessment	**Final Exam**	3hr	50% (60)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction – Different types of functions
Week 2	Coordinate and graph, distance between points, slope and equation of line, domain and range
Week 3	Even, odd function, integer functions, functions defined as pisces composition of a function
Week 4	Inverse function
Week 5	Circle, parabola, hyperbola, ellipse
Week 6	Trigonometric functions
Week 7	Absolute values, matrices
Week 8	Limits and continuity,
Week 9	Continuous functions
Week 10	Derivatives, velocity speed and other rates of change
Week 11	Derivative of trigonometric functions
Week 12	Chain rule, implicit differentiation,
Week 13	Linear approximation, Newton method for approximation
Week 14	Application of derivatives
Week 15	Curve sketching
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	None

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Thomas' Calculus; Early Transcendentals, 12th Ed.; based on the original work by G.B. Thomas; revised by M. Weir and J. Hass, Pearson.	Yes
Recommended Texts	James Stewart (2016). Multivariable Calculus. Cengage Learning.	No
Websites	https://ocw.mit.edu/courses/18-02-multivariable-calculus-fall-2007/	

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Mechanics I**		**Module Delivery**		
Module Type	**Core**		☐ **Theory**		
Module Code	**UOBAB0105012**		☒ **Lecture**		
ECTS Credits	**6**		☐ **Lab**		
SWL (hr/sem)	**150**		☒ **Tutorial**		
			☐ **Practical**		
			☐ **Seminar**		
Module Level	1	**Semester of Delivery**		1	
Administering Department	Type Dept. Code	**College**	Type College Code		
Module Leader	Dr. Salam Razaq	**e-mail**	Sar14@uobabylon.edu.iq		
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**		Ph.D.	
Module Tutor		**e-mail**			
Peer Reviewer Name		**e-mail**			
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aims of an engineering mechanics module are to provide students with a foundational understanding of the principles and applications of mechanics in engineering. Here are some common aims of an engineering mechanics module: Introducing Fundamental Concepts: The module aims to introduce students to the fundamental concepts and principles of mechanics, such as force, moment, equilibrium, motion, and deformation. Develop Problem-Solving Skills: It aims to develop students' problem-solving skills by applying the principles of mechanics to analyze and solve engineering problems. This includes the ability to apply mathematical and scientific techniques to real-world scenarios. Understanding Engineering Systems: The module aims to help students understand the behavior and analysis of various engineering systems, such as structures, machines, and mechanisms. This includes studying the forces and motions involved in these systems and how they interact with each other. Apply Engineering Mechanics Principles: It aims to enable students to apply engineering mechanics principles to design and evaluate engineering solutions. This involves analyzing the forces, stresses, and deformations within structures and machines to ensure their safety, stability, and performance. Develop Visualization Skills: The module aims to develop students' ability to visualize and represent engineering

	systems and their behaviors using diagrams, schematics, and other graphical tools. This is important for
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge of Fundamental Concepts: Demonstrate knowledge and understanding of fundamental concepts in mechanics, including forces, moments, equilibrium, motion, and deformation. Problem-solving Skills: Apply mathematical and scientific techniques to analyze and solve engineering problems related to mechanics, including determining forces, stresses, and deformations in structures and machines. System Analysis: Analyze the behavior and performance of engineering systems, such as structures, machines, and mechanisms, by considering the forces and motions involved and their interactions. Design and Evaluation: Apply engineering mechanics principles to design and evaluate engineering solutions, considering factors such as safety, stability, and performance. Visualization and Representation: Visualize and represent engineering systems and their behaviors using appropriate diagrams, schematics, and other graphical tools, facilitating effective communication of ideas and analysis. Critical Thinking: Analyze and evaluate engineering problems from multiple perspectives, considering the limitations and assumptions of engineering models and making informed decisions based on available data.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures: Conducting lectures to deliver theoretical concepts, fundamental principles, and problem-solving techniques related to engineering mechanics. Visual aids, such as slides, diagrams, and animations, can be used to enhance understanding. Demonstrations: Performing live demonstrations or using simulation software to showcase real-world applications of engineering mechanics principles. This helps students visualize the concepts and their practical implications. Hands-on Experiments: Organizing laboratory sessions where students can perform hands-on experiments related to engineering mechanics. This provides them with a practical understanding of concepts and allows them to validate theoretical principles through data collection and analysis. Problem-Solving Sessions: Engaging students in problem-solving sessions where they can apply engineering mechanics principles to solve a variety of problems. These sessions can be conducted individually or in groups, promoting critical thinking and collaborative learning. Case Studies: Presenting real-life case studies or engineering projects that involve the application of engineering mechanics principles. Students can analyze and evaluate the systems, identify problems, and propose solutions, developing their analytical and design skills. Computer Simulations: Using computer simulations or virtual laboratories to simulate complex engineering systems and their behaviors. This allows students to explore different scenarios, manipulate variables, and observe the effects, fostering a deeper understanding of mechanics principles. Group Projects: Assigning group projects that require students to apply engineering mechanics principles to design, analyze, or optimize a specific engineering system. This promotes teamwork, communication, and integration of knowledge and skills. Active Learning Techniques: Incorporating active learning techniques, such as class discussions, concept mapping, peer teaching, and problem-based learning. These methods encourage student engagement, foster critical thinking, and facilitate knowledge retention.

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

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	Projects / Lab.	2	10% (10)	Continuous	
	Report	1	10% (10)	13	~~LO # 5, 8 and 10~~
Summative assessment	**Midterm Exam**	2 hr	10% (20)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (60)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Vector algebra and vector operations
Week 2	Vector algebra and vector operations
Week 3	Force systems and equilibrium
Week 4	Force systems and equilibrium
Week 5	Force systems and equilibrium
Week 6	Free-body diagrams
Week 7	**Mid-term Exam**
Week 8	Analysis of trusses, frames, and machines
Week 9	Analysis of trusses, frames, and machines
Week 10	Analysis of trusses, frames, and machines
Week 11	Friction and its effects
Week 12	Friction and its effects
Week 13	Center of gravity and centroid
Week 14	Center of gravity and centroid
Week 15	Center of gravity and centroid

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering Mechanics: Statics" by J.L. Meriam and L.G. Kraige (Publisher: Wiley)	No
Recommended Texts	"Engineering Mechanics: Statics and Dynamics" by R.C. Hibbeler (Publisher: Pearson)	Yes
Websites		

Module Information معلومات المادة الدراسية					
Module Title	**Computer I**		**Module Delivery**		
Module Type	**Basic**		☐ **Theory**		
Module Code	**UOBABb4**		☒ **Lecture**		
ECTS Credits	**3**		☒ **Lab**		
SWL (hr/sem)	**75**		☐ **Tutorial**		
			☐ **Practical**		
			☐ **Seminar**		
Module Level	2	**Semester of Delivery**	1		
Administering Department	Type Dept. Code	**College**	Type College Code		
Module Leader	Dr. Hussein Hamid E. Al-Husseini	**e-mail**	E-mail: hussein.emran@uobabylon.edu.iq		
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.		
Module Tutor	Name (if available)	**e-mail**	E-mail: hussein.emran@uobabylon.edu.iq		
Peer Reviewer Name	Name	**e-mail**	E-mail: hussein.emran@uobabylon.edu.iq		
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Teaching the student programming style in general 2. How to solve engineering problems in his specialty through scientific programs 3. Preparing the student for his future life by adopting the BASIC language in solving significant engineering problems (input information and engineering equations) that he faces at work. 4. In the future, he can deal smoothly with ready-made engineering computer systems because he has a scientific background in how programs work.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize Hardware and Software Concepts 2. Summarize what meant of Applications of Information Electronics and Communication Technology (IECT) 3. Discuss Computer Portions 4. Define types of operating systems 5. Discuss Word Processing Basics 6. Define the Basics of Spreadsheets 7. Describe Introduction to Presentation Software 8. Recognize Computer Networks Basics
Indicative Contents المحتويات الإرشادية	1- Introduction to computers, concept of data and information, applications of information electronics. 2- . Computer components, including hardware and software, along with their respective components. 3- Operating system, the basics of the standard operating system, the user interface. 4- Basics of word & spreadsheet, manipulation of cells. 5- Introduction to the Internet and Web Browsers, Computer Networks Basics, Concept of the Internet and Its Applications, Connecting to the Internet.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary strategy to be adopted in delivering this unit is to encourage students' participation in theoretical lectures and practical programmes while at the same time improving and expanding their thinking skills. This will be accomplished through classroom and interactive engineering applications and by considering the type of engineering programs incorporating multiple environmental issues.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	~~LO # 5, 8 and 10~~
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Computer
Week 2	Computer Portions
Week 3	Hardware Parts
Week 4	Basics of Common Operating Systems
Week 5	GUI Components
Week 6	Word Processing Basics
Week 7	Text Creation and Manipulation
Week 8	Basics of Spreadsheets
Week 9	Manipulating Cells , Copying, Cutting, and Pasting:
Week 10	Key Components of Presentation Software:
Week 11	Creating a Presentation
Week 12	Computer Networks Basics
Week 13	LAN and WAN
Week 14	Communications and E-mails
Week 15	Computer Troubleshooting

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Computer
Week 2	Computer Portions
Week 3	Basics of Common Operating Systems
Week 4	GUI Components applications
Week 5	Word Processing Basics
Week 6	Text Creation and Manipulation
Week 7	Basics of Spreadsheets
Week 8	Manipulating Cells , Copying, Cutting, and Pasting:
Week 9	Components of Presentation Software
Week 10	Creating a Presentation
Week 11	Computer Networks Basics
Week 12	LAN and WAN definition
Week 13	Communications and E-mails
Week 14	Computer Troubleshooting
Week 15	Basic troubleshooting technics

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	-	-
Recommended Texts	Technology in action complete, Alan Evans ,16 ed. (2020)	No
Websites		

Module Information معلومات المادة الدراسية					
Module Title	**Engineering and AutoCAD Drawing I**		**Module Delivery**		
Module Type	**Core**		☒ **Theory**		
Module Code	**UOBAB0105014**		☒ **Lecture**		
ECTS Credits	7		☒ **Lab**		
SWL (hr/sem)	**175**		☐ **Tutorial**		
			☐ **Practical**		
			☐ **Seminar**		
Module Level	1	**Semester of Delivery**	1		
Administering Department	Type Dept. Code	**College**	Type College Code		
Module Leader	Afrah Abood Hasan	**e-mail**	Afrah.hasan@uobabylon.edu.iq		
Module Leader's Acad. Title	**Assist. Prof.**	**Module Leader's Qualification**	MS.C		
Module Tutor	Afrah Abood Hasan	**e-mail**	Afrah.hasan@uobabylon.edu.iq		
Peer Reviewer Name	Afrah Abood Hasan	**e-mail**	Afrah.hasan@uobabylon.edu.iq		
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims	The course content introduces the student to general concepts and the basics of drawing using traditional engineering

أهداف المادة الدراسية	drawing tools, such as the letter T ruler and triangles. Scale ruler, stencils, etc. Where the student exercises the correct methods of using these tools and drawing simplified and complex geometric shapes and progresses through the established topics to gradually master complex shapes. The student also learns how to draw geometric processes, the geometric line, and the projections of three-dimensional shapes and their various clips and deduce the hologram from its miscalculations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	When studying the course content, students gain a solid foundation in drawing principles, deduction, and creating horizontal plans for buildings in their various sections. This is completed in the second stage of the study of building materials and construction of buildings.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Study and comprehend general concepts and basic principles in engineering drawing 2. Learn the correct ways to use engineering drawing tools and train the student to draw within the general concepts of speed, accuracy, cleanliness and clarity. 3. Learn to draw lines of different types and draw geometric motifs. 4. Learn to draw circles, arcs and curves with sketch training, small and large circles and arcs 5. Learn to draw the types of thin and thick oblique Arabic and Latin lines and vertical lines. 6. Learn to draw engineering processes separately for each of them, and then practice drawing complex and compound shapes from more than one operation 7. Study the general principles of projection theory and engineering projection methods, including different training on the American and English methods of projection

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is 1- Theoretical: theoretical lectures, giving the material in the form of lectures given on the blackboard and training in engineering drawing on the board. 2- Practical: in the laboratory, the topic is explained in theory and then applied in practice, as well as enhancing lectures by using DATA SHOW with audio and video 3- Encouraging the students to participate in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes and interactive tutorials.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.46
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	10% (10)	7	~~LO #1, 2, 10 and 11~~
	Assignments	2	10% (10)	2, 12	~~LO # 3, 4, 6 and 7~~
	Projects / Lab.	2hr	10% (10)	Continuous	
	Report	0	10% (10)	Continuous	~~LO # 5, 8 and 10~~
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	General concepts and basic principles of engineering drawing, Use of engineering drawing tools
Week 2	Applications of exercises
Week 3	Drawing of lines, adornments, circles, arcs and curves
Week 4	Applications of exercises
Week 5	Types of Arabic and Latin scripts in engineering drawings
Week 6	Applications of exercises
Week 7	Drawing of graphic geometry (Drawing of engineering operations)
Week 8	Applications of exercises
Week 9	Applications of exercises
Week 10	Applications of exercises
Week 11	Principles and methods of orthographic drawing (Engineering projection) – part 1
Week 12	Applications of exercises
Week 13	Applications of exercises
Week 14	Applications of exercises
Week 15	Applications of exercises

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: The knowledge about AutoCAD program environment
Week 2	Lab 2: Major drawing tools in AutoCAD
Week 3	Lab 3: Object snap
Week 4	Lab 4: Modify tools
Week 5	Lab 5: Controlling lines types in AutoCAD Controlling weights types in AutoCAD
Week 6	Lab 6: drawing Graphic geometry (engineering operations)
Week 7	Lab 7: Engineering applications Preparatory week before the final Exam.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Al-Tufaili, M.A.M.A., 2007, "Engineering Sketchbook," University of Babylon, College of Engineering.	yes
Recommended Texts	Abdul Rasoul Al-Khafaf, 1981 "Engineering Drawing", University of Technology.4-Thomas E. French,1980, " A manual of Engineering Drawing ", McGraw Hill book company. Thomas E. French. 1978. "Engineering Drawing and Graphic Technology", McGraw-Hill.	
Websites	https://mrcet.com/downloads/digital_notes/HS/8%20Engineering%20Drawing.pdf Engineering drawing practice manual	

Module Information معلومات المادة الدراسية			
Module Title	**Microbiology**		**Module Delivery**
Module Type	**Core**		☒ **Theory**
Module Code	**UOBAB0105015**		☒ **Lecture**
ECTS Credits	**4.00**		☒ **Lab**
SWL (hr/sem)	**100**		☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Level	1	**Semester of Delivery**	**1**
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Asst. Lec. Fatima Al-Zahraa Kareem Diner	**e-mail**	eng534.fatimah.kareem@uobabylon.edu.iq
Module Leader's Acad. Title	Assistant Lecture	**Module Leader's Qualification**	
Module Tutor	Asst. Lec. Fatima Al-Zahraa Kareem Diner	**e-mail**	eng534.fatimah.kareem@uobabylon.edu.iq
Peer Reviewer Name	Asst. Lec. Fatima Al-Zahraa Kareem Diner	**e-mail**	eng534.fatimah.kareem@uobabylon.edu.iq
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	**1.0**

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This is an introductory module for first-year engineering students in the area of engineering materials. The study of microbes helps us to understand our world and our place within it. It provides us with insights into the complexity of nature and society, which in turn offer numerous benefits in terms of health, environment, social, cultural, industrial, and economic aspects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Upon successful completion, students will have the knowledge and skills to: Describe the diversity of microorganisms and bacterial cell. 2. structure and function, microbial growth and metabolism, and the ways to control their growth by physical and chemical means.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Microbiology and Its History (2 hrs) 2. Classification of Microorganisms (Bacteria, Fungi, Viruses, Parasites, etc.) (3 hrs) 3. Microbiological Characteristics of Bacteria (Cell Structure, Shapes, Classification) (4 hours) 4. Role of Microorganisms in the Environment (Biological Treatment, Degradation of Organic Matter, and Nutrient Cycles) (6 hrs)

	5. Biological Processes in Water (Biological Degradation, Pollution Removal) (4 hrs) 6. Microorganisms in Soil and Water (Environmental Interactions and Beneficial/Detrimental Microbes) (3 hrs) 7. Concept of Environmental Applications of Microorganisms (4 hrs) 8. Microbiological Techniques in Environmental Analysis (Microscopy, Cultivation Techniques, Molecular Techniques) (5 hrs) 9. Water Pollution and Microorganisms (Role of Microorganisms in Water Pollution and Methods of Management) (5 hrs) 10. Microorganisms in Wastewater Treatment (Biological Reactions in Treatment Plants) (4 hrs) 11. Applications of Microorganisms in Environmental Engineering (Using Microbes for Pollution Cleanup and Bioenergy Production) (4 hrs) 12. Microbe Management in Industrial Ecosystems (4 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategy for Microbiology in the Environmental Engineering Department is designed to offer students the opportunity to develop a deep understanding of microbial principles, ecological processes, and their applications in environmental engineering. The strategy will enhance students' ability to apply scientific methodologies, critical thinking, and problem-solving techniques related to the role of microorganisms in environmental systems. This will be achieved through a combination of interactive lectures, hands-on laboratory sessions, and group projects, which will allow students to demonstrate their capability to identify environmental problems, analyze microbial behaviors, and propose scientifically valid solutions. Assessment will be based on practical experiments, case studies, and assignments that encourage students to engage with real-world environmental challenges, ensuring they can effectively communicate their findings and solutions.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.46
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	1	10% (10)	7	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	2 hr	10% (10)	Continuous	
	Report	0	10% (10)	Continuous	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	History of microbiology (the names of the pioneers and their work, the Spontaneous Generation Theory, germ theory
Week 2	History of microbiology (the names of the pioneers and their work, the Spontaneous Generation Theory, germ theory
Week 3	Groups of microbiology (Introduction, protozoa such as flagellates, amoeba, rotifers, crustaceans, algae, fungi, yeast, bacteria, rickettsiae, mycoplasma, viruses, viroid and prion).
Week 4	Study of applied microbiology and the study of microbiology in the soil and solid waste, in water and wastewater, in the air, and the atmosphere
Week 5	Study of applied microbiology and the study of microbiology in the soil, solid waste in water, wastewater, in the air, and the atmosphere

Week 6	Recipes bacterial cells (general characteristics, types of classifications, bilateral label, highlight cells, the size of the cells)
Week 7	Recipes bacterial cells (general characteristics, types of classifications, bilateral label, highlight cells, the size of the cells)
Week 8	Midterm exam
Week 9	Parts of a bacterial cell (flagella, Pilli, capsule, cell wall, protoplast, cytoplasmic embrane, mesosome, granules, spores, nuclear material, plasmids and gas vesicles
Week 10	Parts of a bacterial cell (flagella, Pilli, capsule, cell wall, protoplast, cytoplasmic embrane, mesosome, granules, spores, nuclear material, plasmids and gas vesicles
Week 11	Staining of bacteria (defined staining and dye, dyes and laboratory types, wet and dry Preparation)
Week 12	Nutrition of bacteria (levels of organization, types of energy sources and carbon metabolic).
Week 13	The growth of bacteria (reproduction, growth and measure growth and stages)
Week 14	Bacteria and environmental (Introduction, pH, humidity and drought, light, radiation, pressure, osmosis pressure and kinetic pressure, temperature, turbidity, oxygen, taxis)
Week 15	Microorganisms in the water and sanitary methods of treatment (water supply, evidence of bacteriological water pollution, water-borne diseases, methods of treating water (drinking water and wastewater), water testing and taking water samples to laboratories for testing.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	laboratory safety in microbiology laboratories
Week 2	Type of Culture Media
Week 3	Types of Nutrition for Microorganisms
Week 4	Gram Staining
Week 5	Isolation Method of Microorganisms
Week 6	Lab discussion on previous experiments
Week 7	Purification Method of Microorganisms
Week 8	Standard Plate Count (SPC)
Week 9	Lab discussion on previous experiments
Week 10	Spore Staining
Week 11	Bacterial count
Week 12	Lab discussion on previous experiments
Week 13	Bacteriological Examination of Water
Week 14	Sterilization and Disinfection
Week 15	Lab discussion on previous experiments

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Hart, T. and Shears, P., 1996. Color atlas of medical microbiology. (No Title).	No
Recommended Texts	1. Mahy, B.W. and Van Regenmortel, M.H. eds., 2010. Desk encyclopedia animal and bacterial virology. Academic Press.	yes
Websites		

Module Information معلومات المادة الدراسية		
Module Title	**Democracy and Human Rights**	**Module Delivery**

Module Type	**Basic**	☐ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	**UOBABb3**	
ECTS Credits	**2**	
SWL (hr/sem)	**50**	

Module Level	**1**	**Semester of Delivery**	**1**
Administering Department	**Type Dept. Code**	**College**	**Type College Code**
Module Leader	**Dr. Safaa Abdel Wahid Abboud**	**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	**1/9/2024**	**Version Number**	**1**

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course traces the evolution of Western democratic theory from the ancient Greeks to the present, placing particular emphasis on the institutions that influenced and were in turn influenced by these evolving theories. The readings range from Aristotle and Hobbes to Habermas and Foucault, with a brief exploration of Islamic thought included. The course has two primary aims: to foster an appreciation of the historical context behind the ideas that have shaped today's democracies and to pose critical, normative questions relevant to the present day. 1. To introduce students to the meaning of democracy and the role of governance. 2. To help them understand the various approaches to studying democracy and governance.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	Understand theoretical debates about the nature of democracy. Demonstrate knowledge of the work of key political theorists on democracy. Critically engage with this work.
Indicative Contents المحتويات الإرشادية	The course will be divided into three sections. The first section will explore what it means to be radical today, considering the idea of critique (Boltanski), the broader notion of radicalisation, variations on the left and right, the political context, and global manifestations. The second section will trace the intellectual trajectory of radical democracy within the Marxist and post-structuralist traditions. The final section will examine prominent theories of radical democracy, including those of Hardt and Negri, Laclau and Mouffe's concept of counter-hegemony, Graeber's and Lash's notions of post-hegemony, as well as more recent revivals of communism by Zizek, Bosteels, and Jodi Dean. This section will align theories with specific themes that evoke visions of renewal and change, such as neoliberalism and equality.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	On successful completion of the module, students will be able to: - Demonstrate a good understanding of contemporary debates in radical democracy; - Critically engage with the issues triggering radical (re)thinking (such as neoliberalism or inequality); - Critically evaluate the strengths and weaknesses of different proposals for political change; - Draw on a range of theoretical approaches to discuss current affairs.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	Projects / Lab.	2	10% (10)	Continuous	
	Report	1	10% (10)	13	~~LO # 5, 8 and 10~~
Summative assessment	Midterm Exam	2 hr	10% (20)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (60)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Human Rights / The roots of human rights and their development in human history, human rights in ancient civilizations and divine laws
Week 2	Medieval and Modern Human Rights, Contemporary Recognition of Human Rights
Week 3	The contents of human rights / human rights in international and regional conventions and national legislation, forms and generations of human rights.
Week 4	Human rights guarantees and protection, human rights guarantees and protection at the national level
Week 5	Guarantees and protection of human rights at the regional and international levels, the role of the United Nations in protecting human rights / the role of regional non-governmental organizations
Week 6	Public rights and freedoms, basic concepts about public freedoms
Week 7	The problem of public freedoms and their development, human rights / the roots of human rights and their development in human history
Week 8	Human rights in ancient civilizations and divine laws, the concept of rights and freedoms
Week 9	Divisions of public rights and freedoms/relativity of rights/balance between public freedoms and public interest. / special division of types of the rights and liberties
Week 10	Rights and freedoms related to human personality / right to life/right to security/freedom of movement/sanctity of residence/confidentiality of correspondence. Rights and freedoms related to human thought/religious freedom/freedom of opinion/freedom of education/freedom/freedom of assembly/freedom of association, and association.
Week 11	Rights and freedoms related to human activity / the right to work
Week 12	The rights of political participation / public freedoms in Islam / democracy / the concept of elections / Democratic governance
Week 13	Divisions of public rights and freedoms/relativity of rights
Week 14	Balance between public freedoms and the public interest
Week 15	Seminar exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1.D. Trend (ed.) (1996). Radical Democracy: Identity, Citizenship and the State. London and New York: Dean, J. (2009). Politics Without Politics. Parallax 15(3):20-36. 2. Hardt, M. and Negri, A. (2000) Empire. Cambridge, Massachusetts and London, England: Harvard University Press. 3. Hardt, M. and Negri, A. (2004) Multitude: War and Democracy in the Age of Empire. London and New York:	No
Recommended Texts	1. Hamish Hamilton, Penguin Books. Hardt, M. and Negri, A. (2009). Commonwealth. Cambridge, MA: Harvard University Press. 2. Hardt, M. and Negri, A. (2012) Declaration. New York: Argo Navis Author Services.	No
Websites	Any website talking about specific related materials.	

Module Information معلومات المادة الدراسية		
Module Title	**English Language I**	**Module Delivery**
Module Type	**Basic**	☐ **Theory**
Module Code	**UOBABb1**	

ECTS Credits	2	☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
SWL (hr/sem)	**50**	

Module Level	1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Dr. Wathiq Al-Jabban	**e-mail**	wathiq.aljabban@uobabylon.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Learning English can enhance one's communication skills, facilitating effective interaction with people worldwide. English speakers have a better chance of finding jobs and obtaining more opportunities in their respective fields. Being proficient in the language also helps to gain a better understanding of different cultures. Additionally, when one is familiar with English, it becomes easy to access vast amounts of knowledge existing online. 2. English can also be used as a tool for developing better cognitive skills. This is achieved by reading other published works, expanding one's vocabulary, or listening to conversations and lectures. Being able to use the language fluently also opens up opportunities to access information, which helps to broaden one's perspective on different topics. Additionally, interpreting texts and articles written in English enhances one's cognitive skills as well as one's ability to form logical conclusions. Learning English can help to increase self-confidence. Speaking English effectively plays a crucial role in navigating challenging situations. When one is fluent in a language, they can express their thoughts and suggestions to an audience or in formal settings with ease. As a result, it will improve the ability to deliver powerful speeches in formal situations. Furthermore, learning English enhances one's self-esteem and confidence as a global citizen. Additionally, when one can understand English, they can better comprehend various political and social issues, thereby becoming a more educated global individual. To understand voltage, current and power from a given circuit.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Unit One of English language learning focuses on how to say hello and introduce oneself. Being able to use basic greeting phrases is a fundamental part of any language, so it's essential to start with mastering it. Along with learning to say hello, there are essential grammar points that need to be considered, as well as topic-specific vocabulary and key everyday English skills. Furthermore, specific topics such as work English and how to discuss your job can be introduced and explored. 2. To gain a comprehensive understanding of Unit Two, it is essential to grasp the various concepts it encompasses. This includes learning new words and grammar, developing your skills in practice exercises, and getting more comfortable and confident with using English in everyday contexts. 3. Unit Three of English language teaching focuses on helping students understand the basics of the language and how it functions in everyday communication. This unit focuses on grammar, vocabulary, skills work and Everyday English. 4. In Unit Four of our language class, we delve into the concepts of family and friends, exploring various aspects of grammar, vocabulary, and related skills, as well as everyday English. Broadly speaking, family and friends are an important part of human life, and so it's natural to explore how to talk about them in a second language. 5. Unit Five: The Way I Live has been a great learning experience for me since it involved the study of grammar, vocabulary, skills work and vocabulary everyday English. Grammar focused on developing my understanding of sentence structure and how to comprehend verb tenses and other related components. Additionally, learning new vocabulary broadened my knowledge base and enabled me to use more expressive phrases. Lastly, Skills Work and Everyday English helped me enhance my everyday communication, enabling me to express myself more effectively and understand others better. 6. Unit Six of the English course was immensely helpful in furthering my understanding of the language. In this unit, I focused on grammar and vocabulary and also practiced my skills in work-related and everyday English. Specifically, I made sure to pay attention to the difficult rules behind grammar, as well as new words I needed to learn. I also worked on improving my communication skills by practicing speaking and writing in English. Finally, I focused on using appropriate everyday language to make sure I can apply my English skills in real-life settings. 7. Unit Seven has quickly become the favorite unit in the English language. In this unit, we focus on honing our grammar, expanding our vocabulary, sharpening our skills, and enriching our everyday English. Ultimately, the course equips students with the skills necessary to use English confidently in their daily lives. We will cover practical topics such as polite conversation, understanding native colloquialisms, and having real-life conversations with friends, family, and colleagues. Furthermore, our interactive activities, such as role-play conversations and debates, will provide students with the opportunity to apply the knowledge they are gaining in the course. With the comprehensive skill set our course provides, learners will have the tools to excel in everyday English.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. To help English learners become more proficient in the language. It offers a variety of tips and strategies designed to enhance a learner's understanding of English, as well as their reading, writing, and speaking abilities. Relevant activities, techniques and articles can be found on the blog, helping English learners build their confidence in their language skills. [15 hrs] Additionally, it offers interactive activities, including grammar quizzes, English language games, and writing and conversation challenges. These activities offer learners the opportunity to practice their English practically and enjoyably. They also provide learners with the opportunity to compare their knowledge with that of other English learners. [10 hrs] Additionally, it provides videos, podcasts, and audio recordings. The videos are specifically designed for English learning, featuring conversations, discussions, and stories. The podcasts and audio recordings feature English conversations that cover a range of topics, providing learners with valuable English listening practice. [5 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Learning English can be a difficult task; however, with the right approach and strategies, it can become much easier. Dedicating yourself to developing English skills is key to attaining fluency and successful communication. Here are some simple yet effective strategies for developing English proficiency: 1. Read Regularly: Developing good reading skills is essential for language acquisition. Reading widely, from newspapers to novels, can help you learn more about the language and increase your vocabulary. Reading in English can help you learn grammar and sentence structure more quickly. 2. Listen Actively: Listening actively means not only understanding what is being said but also comprehending the inferences and subtleties behind the language. Developing your listening skills can help you become more confident when speaking English. 3. Use Technology: Technology can be a powerful tool, helping you to practice both listening and pronunciation. Watch movies, TV shows, and listen to podcasts in English to improve your comprehension. You can also practice pronouncing different words with the help of free websites and apps. 4. Speak Mindfully: When trying to converse in a foreign language, it can be difficult to create the right phrases and words to express yourself. To practice speaking English confidently, remember to focus on specific topics that interest you and on which you have good knowledge. This will help you to talk properly and accurately. 5. Immerse Yourself: Surrounding yourself with English, whether in conversations or a native-English-speaking community, provides exposure to the language and makes it easier to use. Learning English doesn't have to be a solo experience; practicing with others helps maintain motivation as you deepen your language skills.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	LO #1, 2, 10 and 11
	Assignments	5	10% (10)	2, 4,9,12,15	LO # 3, 4, 6 and 7
	Report	2	10% (10)	Continuous	LO # 5, 8 and 10
	Homework	1	10% (10)	13	LO 3 # 4 to 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Unit One: Hello / Grammar; Vocabulary; Skills, Work and Everyday English.
Week 2	Unit One: Hello / Grammar; Vocabulary; Skills, Work and Everyday English.
Week 3	Unit Two: Your Word/ Grammar; Vocabulary; Skills Work and Everyday English.
Week 4	Unit Two: Your Word/ Grammar; Vocabulary; Skills Work and Everyday English.
Week 5	Unit Three: All about you/ Grammar; Vocabulary; Skills Work and Everyday English.
Week 6	Unit Three: All about you/ Grammar; Vocabulary; Skills Work and Everyday English.
Week 7	Mid-term Exam + Unit (1 to 3)
Week 8	Unit Four: Family and Friends/ Grammar; Vocabulary; Skills Work and Everyday English.
Week 9	Unit Four: Family and Friends/ Grammar; Vocabulary; Skills Work and Everyday English.
Week 10	Unit Five: The way I live / Grammar; Vocabulary; Skills Work and Everyday English.
Week 11	Unit Five: The way I live / Grammar; Vocabulary; Skills Work and Everyday English.
Week 12	Unit Six: Every Day/ Grammar; Vocabulary; Skills Work and Everyday English.
Week 13	Unit Six: Every Day/ Grammar; Vocabulary; Skills Work and Everyday English.
Week 14	Unit Seven: My Favorites / Grammar; Vocabulary; Skills Work and Everyday English.
Week 15	Unit Seven: My Favorites / Grammar; Vocabulary; Skills Work and Everyday English.
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	New Headway Plus Beginner / Oxford University Syllabus	No
Recommended Texts		No
Websites		

Module Information معلومات المادة الدراسية			
Module Title	**Mathematics II**	**Module Delivery**	
Module Type	**Core**	☐ **Theory**	
Module Code	**UOBAB0105021**	☒ **Lecture**	
ECTS Credits	**6**	☐ **Lab**	
SWL (hr/sem)	**150**	☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	1	**Semester of Delivery**	1

Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Dr. Zaid Ali Hasan		**e-mail**	zaid.hasan.bib@atu.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		**1/9/2024**	**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The primary goal of this module is to help students become familiar with the various types of functions and how to determine their domains and ranges. They will also deal with the basic concept of functions and their graphs. 2. The second primary goal of this course is to familiarize the students with the basic concepts of trigonometric functions, inverse functions, and the basic concepts of limits and continuity of functions. 3. The third goal is to understand the basic concept of function derivatives, speed, and other rates of change. As well as the basic concept of derivatives of trigonometric functions, the chain rule implicit differentiation, linear approximation, and the application of derivatives.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students will be able to: 1. Students learn to interpret and evaluate quantitative or symbolic models such as graphs, tables, units of measurement, and distributions. In Limits, students can read limits from graphs, compute them from tables and algebraic formulas of functions. Continuity is taught by interpreting graphs of functions and analytically by using a limited definition of continuity. The Derivative is introduced as a rate of change and as a graphical representation of the slope of the tangent line of the graph of a function. 2. Students will be able to perform algebraic computations and obtain solutions using equations and formulas. 3. Students learn Limits using graphs of functions and algebraic computations. Continuity is taught by interpreting graphs of functions and analytically by using limited definitions of continuity. 4. Students learn to use mathematical thinking to solve various problems, such as maximizing the volume of a box or a cone with a fixed surface area. Demonstrate an intuitive and computational understanding of partial derivatives and their applications by solving a variety of problems, such as computing velocity and acceleration.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – functions Algebraic functions, trigonometric functions, domain and range for various types of functions, absolute values, even, odd functions, and integer functions. Additionally, students will be able to graph various types of functions [24 hours]. Part B – Limit and continuity Read limits from graphs and compute them from tables and algebraic formulas of functions. Continuity is taught by interpreting graphs of functions and analytically by using a limited definition of continuity. [20 hrs.] Part C – Partial Derivatives Partial derivatives of a function of two variables; Partial derivatives of a function of more than two variables; The Chain rule; extreme points. [16 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course is taught as a lecture course with student participation. Classroom lectures are held to illustrate concepts. Student assignments are used to enhance concepts.

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

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	Projects / Lab.	2	10% (10)	Continuous	
	Report	1	10% (10)	13	~~LO # 5, 8 and 10~~
Summative assessment	**Midterm Exam**	2 hr	10% (20)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (60)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Optimization (part 1)
Week 2	Optimization (part 2)
Week 3	Applications of derivatives
Week 4	Hospitals rule
Week 5	Inverse trigonometric function
Week 6	Drawing inverse trigonometric functions
Week 7	Transcendental functions
Week 8	Hyperbolic function

Week 9	1st mid Exam
Week 10	Introduction to integration
Week 11	Indefinite integration
Week 12	Integration of trigonometric functions
Week 13	Application of definite integral, area, volume, surface area, length of curve (1)
Week 14	Application of definite integral, area, volume, surface area, length of curve (2)
Week 15	2nd mid Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Thomas' Calculus; Early Transcendentals, 12th Ed.; based on the original work by G.B. Thomas; revised by M. Weir and J. Hass, Pearson.	Yes
Recommended Texts	James Stewart (2016). Multivariable Calculus. Cengage Learning.	No
Websites	https://ocw.mit.edu/courses/18-02-multivariable-calculus-fall-2007/	

Module Information معلومات المادة الدراسية				
Module Title	**Engineering Mechanics II**		**Module Delivery**	
Module Type	**Core**		☐ **Theory**	
Module Code	**UOBAB0105022**		☒ **Lecture**	
ECTS Credits	**6**		☐ **Lab**	
SWL (hr/sem)	**150**		☒ **Tutorial**	
			☐ **Practical**	
			☐ **Seminar**	
Module Level	1	**Semester of Delivery**		1
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	Asst. Lec. Issra Hussien Ali	**e-mail**	Sar14@uobabylon.edu.iq	
Module Leader's Acad. Title	Asst. Lecturer	**Module Leader's Qualification**		MSc
Module Tutor		**e-mail**		
Peer Reviewer Name		**e-mail**		
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	An engineering mechanics module aims to provide students with a foundational understanding of the principles and applications of mechanics in engineering. Here are some common aims of an engineering mechanics module: Introducing Fundamental Concepts: This module introduces students to the fundamental concepts and principles of mechanics, including force, moment, equilibrium, motion, and deformation. Develop Problem-Solving Skills: It aims to develop students' problem-solving skills by applying the principles of mechanics to analyze and solve engineering problems. This includes the ability to apply mathematical and scientific techniques to real-world scenarios. Understanding Engineering Systems: The module aims to help students understand the behaviour and analysis of various engineering systems, such as structures, machines, and mechanisms. This includes studying the forces and motions involved in these systems and how they interact. Apply Engineering Mechanics Principles: This aims to enable students to apply engineering mechanics principles in designing and evaluating engineering solutions. This involves analyzing the forces, stresses, and deformations within structures and machines to ensure their safety, stability, and performance. Develop Visualization Skills: The module aims to develop students' ability to visualize and represent engineering systems and their behaviours using diagrams, schematics, and other graphical tools.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge of Fundamental Concepts: Demonstrate knowledge and understanding of fundamental concepts in mechanics, including forces, moments, equilibrium, motion, and deformation. Problem-solving Skills: Apply mathematical and scientific techniques to analyze and solve engineering problems related to mechanics, including determining forces, stresses, and deformations in structures and machines. System Analysis: Analyze the behaviour and performance of engineering systems, such as structures, machines, and mechanisms, by considering the forces and motions involved and their interactions. Design and Evaluation: Apply engineering mechanics principles to design and evaluate engineering solutions, taking into account factors such as safety, stability, and performance. Visualization and Representation: Visualize engineering systems and their behaviours using appropriate diagrams, schematics, and others.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Visualization and Representation: Visualize and represent engineering systems and their behaviors using appropriate diagrams, schematics, and other graphical tools, facilitating effective communication of ideas and analysis. Critical Thinking: Analyze and evaluate engineering problems from multiple perspectives, considering the limitations and assumptions of engineering models and making informed decisions based on available data

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The teaching and learning strategies vary to include a mix of traditional and modern methods aimed at enhancing students'

	understanding and developing their skills. These include: 1) Lectures that cover the fundamental concepts of the subject being taught in the semester. Various educational tools are used to enhance students' understanding, including traditional presentations and diagrams, to clarify complex concepts. 2) Engaging students in the learning process through group discussions, problem-solving, and reports submitted by the students on the subject. 3) Training students to apply concepts through assignments and exercises. 4) Continuous assessment of students, which includes short quizzes, in-class assignments, and homework.

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

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	Projects / Lab.	2	10% (10)	Continuous	
	Report	1	10% (10)	13	~~LO # 5, 8 and 10~~
Summative assessment	**Midterm Exam**	2 hr	10% (20)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (60)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Force systems and equilibrium
Week 2	Force systems and equilibrium
Week 3	Analysis of trusses, frames, and machines
Week 4	Analysis of trusses, frames, and machines
Week 5	Analysis of trusses, frames, and machines
Week 6	Method of joints
Week 7	Mid-term Exam
Week 8	Method of joints
Week 9	Centre of gravity and centroid
Week 10	Centre of gravity and centroid
Week 11	Centre of gravity and centroid
Week 12	Friction and its effects
Week 13	Friction and its effects
Week 14	Centre of gravity and centroid
Week 15	Centre of gravity and centroid

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering Mechanics: Statics" by J.L. Meriam and L.G. Kraige (Publisher: Wiley)	Yes
Recommended Texts	"Engineering Mechanics: Statics and Dynamics" by R.C. Hibbeler (Publisher: Pearson)	No
Websites		

Module Information معلومات المادة الدراسية					
Module Title	**Computer programming II**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory**	
Module Code	**UOBAB0105023**			☒ **Lecture**	
ECTS Credits	3			☒ **Lab**	
SWL (hr/sem)	**75**			☐ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	1	**Semester of Delivery**	2		
Administering Department	Type Dept. Code	**College**	Type College Code		
Module Leader	Hussein Ali Hussein	**e-mail**			
Module Leader's Acad. Title	Assistant Lect.	**Module Leader's Qualification**	MSc.		
Module Tutor		**e-mail**			
Peer Reviewer Name		**e-mail**			
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0		

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

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

Module Aims أهداف المادة الدراسية	The language of programming, in all its forms, is significant in the modern day. It organizes one's life in terms of services, communication, transportation, traffic, banking, as well as the fields of education, industry, military affairs, etc. Educating students in programming is essential as it is key to understanding other sciences which the students may be learning. It provides tools to carry out various, complex calculations in a simple manner that is easily understood. It also develops practical skills that can be used to quickly and ideally solve problems in daily life.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The objective for this course is to determine the outcomes to be achieved by the student based on skill and cognitive performance, as well as the use of clear and specific language accurately.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. About the electronic computer [7 hrs] 2. Structuring the solution of engineering problems using algorithms and representing engineering problems with a flowchart [15 hrs] 3. Commands and sentences in QBASIC. [15 hrs] 4. Storing large groups of data under one name using the matrix. [10 hrs] 5. Making programs brief by using sub-programs which are written once and can be recalled many times within the main program [15 hrs] 6. Storing information in a specific form and order within files so that a section or all of this information can be obtained at any time. [6 hrs] 7. Addressing some critical methods in numerical analysis to introduce this type of mathematics used in solving scientific problems. [15 hrs] 8. The student understands the basic concepts of programming in BASIC. [8 hrs] 9. Learn how to understand problems and dilemmas and the possibility of solving them [7 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary strategy that will be adopted in delivering this module is 1- Theoretical: theoretical lectures with a slide show of figures and tables. 2- Practical: in the laboratory, the program is explained in theory and then applied in practice. 3. Encouraging students to participate in the exercises while refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials, and conducting simple experiments involving sampling activities that are engaging for the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Sub-programs (Subroutines)
Week 2	Matrices (variables tagged) Arrays
Week 3	Plurality of sub-programs with illustrative examples
Week 4	Application of science in environmental engineering
Week 5	Using subroutines with matrices
Week 6	Solving series by using subroutines
Week 7	Examples with environmental matrices, equality arrays, array assignment and array sections divide
Week 8	Perform calculations on arrays, intrinsic operations, search matrices, and arrange menus and the selection process
Week 9	Replaces and repetition of the sub-programs and the re-definition of indirect with examples
Week 10	Sentence input and output
Week 11	Format print modes and determine the print position editing
Week 12	Files, illustrative examples for dealing with files
Week 13	Introduction to run with software
Week 14	Introduction to Windows
Week 15	Application of science in environmental engineering

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Sub- programs (Subroutines) with applications
Week 2	Lab 2: Matrices (variables tagged) Arrays
Week 3	Lab 3: Using sub routines with matrices
Week 4	Lab 4: Sentences input and output
Week 5	Lab 5: Application of science in environmental engineering

Week 6	Lab 6: run with software
Week 7	Lab 7: Files

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	QuickBASIC: The Complete Reference Paperback – 1 Mar 2020, by Steven Numeroff. QuickBasic: Programming Techniques and Library Development IDG Books Worldwide, Namir Clement Shammas, Inc. Foster City, CA, USA ©2021 , ISBN:1558510044.	no
Recommended Texts	Quick BASIC: Advanced Techniques (Programming Series), Aitken, Peter G., 2022.	yes
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Module Information معلومات المادة الدراسية					
Module Title	**Engineering and Auto Cad Drawing I**		**Module Delivery**		
Module Type	**Core**		☒ **Theory**		
Module Code	**UOBAB0105024**		☒ **Lecture**		
ECTS Credits	7		☒ **Lab**		
SWL (hr/sem)	**175**		☐ **Tutorial**		
			☐ **Practical**		
			☐ **Seminar**		
Module Level	1	**Semester of Delivery**		2	
Administering Department	Type Dept. Code	**College**	Type College Code		
Module Leader	Afrah Abood Hasan	**e-mail**	Afrah.hasan@uobabylon.edu.iq		
Module Leader's Acad. Title	Assist. Prof.	**Module Leader's Qualification**		MS.C	
Module Tutor	Afrah Abood Hasan	**e-mail**	Afrah.hasan@uobabylon.edu.iq		
Peer Reviewer Name	Afrah Abood Hasan	**e-mail**	Afrah.hasan@uobabylon.edu.iq		
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	2.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The course content introduces the student to general concepts and the basics of drawing using traditional engineering drawing tools, such as the letter T ruler and triangles. Scale ruler, stencils, etc. Where the student exercises the correct methods of using these tools and drawing simplified and complex geometric shapes, and complex shapes gradually through the established topics. The student also learns how to draw geometric processes, the geometric line, and the projections of three-dimensional shapes and their various clips and deduce the hologram from its miscalculations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	When studying the course content, students gain a solid foundation in drawing principles, deduction, and creating horizontal plans for buildings in their various sections. This is completed in the second stage of the study of building materials and construction of buildings.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Study and comprehend general concepts and basic principles in engineering drawing 2. Learn the correct ways to use engineering drawing tools and train the student to draw within the general concepts of speed, accuracy, cleanliness and clarity. 3. Learn to draw lines of different types and draw geometric motifs. 4. Learn to draw circles, arcs and curves with sketch training. Small and large circles and arcs 5. Learn to draw the types of thin and thick oblique Arabic and Latin lines and vertical lines 6. Learn to draw engineering processes separately for each of them, and then practice drawing complex and compound shapes from more than one operation 7. Study the general principles of projection theory and engineering projection methods, including different training on the American and English methods of projection

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is 1- Theoretical: theoretical lectures, giving the material in the form of lectures given on the blackboard and training in engineering drawing on the board. 2- Practical: in the laboratory, the topic is explained in theory and then applied in practice as well as Enhancing lectures by using DATA SHOW with audio and video 3- . Encouraging students to participate in the exercises while refining and expanding their critical thinking skills. This will be achieved through classes and interactive tutorials.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.46
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

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

	Report	0	10% (10)	Continuous	~~LO # 5, 8 and 10~~
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	General concepts and basic principles of engineering drawing, Use of engineering drawing tools
Week 2	Applications of exercises
Week 3	Drawing of lines, adornments, circles, arcs and curves
Week 4	Applications of exercises
Week 5	Types of Arabic and Latin scripts in engineering drawings
Week 6	Applications of exercises
Week 7	Drawing of graphic geometry (Drawing of engineering operations)
Week 8	Applications of exercises
Week 9	Applications of exercises
Week 10	Applications of exercises
Week 11	Principles and methods of orthographic drawing (Engineering projection) – part 1
Week 12	Applications of exercises
Week 13	Applications of exercises
Week 14	Applications of exercises
Week 15	Applications of exercises

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Knowledge about the AutoCAD program environment
Week 2	Lab 2: Major drawing tools in AutoCAD
Week 3	Lab 3: Object snap
Week 4	Lab 4: Modify tools
Week 5	Lab 5: Controlling line types in AutoCAD, Controlling weight types in AutoCAD
Week 6	Lab 6: drawing Graphic geometry (engineering operations)
Week 7	Lab 7: Engineering applications Preparatory week before the final Exam.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Al-Tufaili, M.A.M.A., 2007. Engineering Drawing Book. University of Babylon, College of Engineering	yes
Recommended Texts	2-Abdel-Rasoul Abdel-Hussein, 1981, "Engineering Drawing", University of Technology. 3-Thomas E. French,1978, " Engineering Drawing and Graphic Technology", McGraw Hill. 4-Thomas E. French,1980, " A manual of Engineering Drawing ", McGraw Hill book company.	
Websites		

Module Information معلومات المادة الدراسية					
Module Title	**Arabic Language**		**Module Delivery**		
Module Type	**Basic**		☐ **Theory**		
Module Code	**UOBABb2**		☒ **Lecture**		
ECTS Credits	**2**		☐ **Lab**		
SWL (hr/sem)	**50**		☐ **Tutorial** ☐ **Practical** ☐ **Seminar**		
Module Level	2	**Semester of Delivery**		1	
Administering Department	Type Dept. Code	**College**	Type College Code		
Module Leader	Amer Kazem Mohammed	**e-mail**	amer.Kazem 1975@gmil.com		
Module Leader's Acad. Title	Assist. Lecturer	**Module Leader's Qualification**		MSc	
Module Tutor		**e-mail**			
Peer Reviewer Name		**e-mail**			
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Arabic (classical, pre-20th-century, and modern) is one of the most important languages required to understand Middle East culture and Medieval history. Arabic is the official language of the United Nations and is widely spoken in many parts of the world. Learning Arabic is essential for those with an interest in gaining a comprehensive understanding of Islamic history and the intricate connections between Islamic and Christian cultures, as well as political, economic, and linguistic developments throughout the Middle Ages to the present day. Students interested in working at international organizations or businesses are also welcome. Arabic is important for various reasons: • It is the fifth most spoken language in the world, an official language of the United Nations and many countries

	• It provides access to a vast number of written sources beyond Islamic texts • There is a high demand for non-native Arabic speakers in the world, but the supply is low • Arabic is the largest Semitic language and provides a perfect introduction to other Semitic languages such as Hebrew or Amharic. Many languages are based on the Arabic alphabet, including Persian, Dari, Urdu, and Kurdish. • It is a sound basis for learning other Arabic-related languages such as Ottoman Turkish and Persian • Arabic features interesting language phenomena, including diglossia, numerous dialects, a root system, and more. • Learning Arabic facilitates the understanding of different art forms (calligraphy, music, literature) • Knowing Arabic fosters understanding between Middle Eastern and Western societies
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After this term of learning Arabic, students will be able to obtain a "general use" of the language; they will achieve the following: • Write and read Arabic almost perfectly, even without using vowel signs. • Understand much of the standard Arabic language by listening, as well as, depending on student skills, a basic level of speaking (standard language, not dialect). • Read, understand, analyze and translate moderate Arabic texts and a wide range of primary historical resources. • Acquire essential basics for future language learning. Besides gaining a comprehensive understanding of the language, students will also gain insight into some features of Islamic culture, particularly Arab culture. This will lead to an understanding of the environment in which the source material, written in Arabic, originated. Participants' abilities in Arabic will be assessed through a short quiz (15-20 minutes) every two weeks and a final examination at the end of the semester.
Indicative Contents المحتويات الإرشادية	Each class will begin with a brief review of the material learned in the previous lessons. Then, we will review the assigned homework, continue learning grammar and practicing grammatical rules, read various texts, and finally (depending on the time remaining) train the oral use of the language. Regular homework will be assigned; students should expect to dedicate at least three times as much time outside the classroom as inside the classroom to successful participation in this class. Students will also be able to listen to Arabic voice recordings, allowing them to distinguish different Arabic pronunciations. Speaking practices help gain insight into the dialects of Arabic.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Reading Arabic texts in source language opens a vast and new horizon for the student in learning Medieval history and following the developments of Arabic language throughout 15 centuries of continuous usage. The course provides practical linguistic and cultural backgrounds for research purposes. Participants can learn to read essential Arabic written sources on the intermediate level. Achieving the ability to read and later analyze historical Arabic texts provides the student not only with a unique capability to understand most intercultural and political events between Medieval Europe and the Middle East, but also the opportunity to create their own standpoint concerning those events. This course offers more than just a language course; students can also acquire essential insights into the culture and traditions of the Arab world. Students can expect an interactive course in a small group, which provides an opportunity for individual study schemes. Learning Arabic requires constant commitment and ambition to overcome the challenges of the language, which can be difficult at first but become more manageable later.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	HW.	2	10% (10)	6,12	~~All~~
	Report	2	10% (10)	9,13	~~All~~
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction Learning the alphabet – writing skills
Week 2	Learning the alphabet, writing skills + exercises
Week 3	Writing skills + exercises Grammar 1-2 Reading: Schulz, Krahl, Reuschel: Standard Arabic - lesson 2 + exercises.
Week 4	Grammar 3-4 + practicing exercises Reading: Schulz, Krahl, Reuschel: Standard Arabic – lesson 3 + oral communication
Week 5	Short quiz Grammar 5 Reading: Standard Arabic – lesson 4 + exercises + oral communication (Al-Asas p.1)
Week 6	Revision 1 Grammar 6-7 + exercises Reading: Standard Arabic – lesson 5 + short text translation and analysis.
Week 7	Grammar 8-9 + exercises Standard Arabic – lesson 6 Reading: conversations (Al-Asas)
Week 8	Grammar 10-11 + exercises Reading: Duroos al-Lugha al-Arabiyya Fatwa online – lessons 1-6
Week 9	Revision 2: Standard Arabic lessons 2-6 Grammar 12-13 + exercises Reading: conversation (Al-Asas) + oral communication
Week 10	Short quiz. Grammar 14-16 + exercises Standard Arabic – lesson 7
Week 11	Grammar 14-16 + exercises Standard Arabic – lesson 7
Week 12	Grammar 17-20 Standard Arabic – lesson 8 Reading: Durus al-Luga al-Arabiyya + overall revision + text analysis
Week 13	Grammar 17-20 Standard Arabic – lesson 8 Reading: Durus al-Luga al-Arabiyya + overall revision + text analysis
Week 14	lesson 8 Reading: Durus al-Luga al-Arabiyya + overall revision + text analysis
Week 15	**Seminar exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Fawzieh A. Bader: Al-Asas for Teaching Arabic for Non-Native Speakers. Part 1 (Beginner Level). Noorart Inc. 2010. 2. Kristen Brustad - Abbass al-Tonsi - Mahmoud al-Batal: Al-Kitaab fii Taallum al-Arabiyya with DVDs. Parts I-II. Georgetown University Press. DVDs are included. 3. Schulz, Krahl, Reuschel: Standard Arabic. An elementary-intermediate course. Cambridge University Press, 2000 (for grammar).	No
Recommended Texts	4. Karin C. Ryding: A Reference Grammar of Modern standard Arabic. Cambridge University Press, 2005 (complementary material). 5. A. F. L. Beeston: The Arabic Language Today. Hutchinson & Co Ltd, 1970. 6. Adam Gacek: Arabic Manuscripts. A Vademecum for Readers. Brill, 2009.	No
Websites	Any web site talking about specific related materials.	

Module Information معلومات المادة الدراسية					
Module Title	**Introduction to Environmental Engineering**			**Module Delivery**	
Module Type	**Basic**			☐ **Theory**	
Module Code	**UOBAB0105026**			☒ **Lecture**	
ECTS Credits	**2**			☐ **Lab**	
SWL (hr/sem)	**50**			☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	2	**Semester of Delivery**		1	
Administering Department	Type Dept. Code	**College**	Type College Code		
Module Leader	Asst. Lec. Fatima Al-Zahraa Kareem Diner	**e-mail**	eng534.fatimah.kareem@uobabylon.edu.iq		
Module Leader's Acad. Title	Assist. Lecturer	**Module Leader's Qualification**		MSc	
Module Tutor		**e-mail**			
Peer Reviewer Name		**e-mail**			
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. This Module focuses on introducing students to the fundamental concepts of environmental engineering, establishing a strong foundation for understanding environmental issues, and the engineering approaches used to address them. 2. This Module assists students in understanding the principles of environmental chemistry, including chemical reactions, pollutant behavior, and how chemical processes affect environmental quality and human health. 3. This Module introduces students to water pollution, including sources, types of pollutants, and their impacts on aquatic ecosystems and human health. 4. This module provides a comprehensive understanding of water quality control methods, with a focus on advanced techniques for managing water pollutants and ensuring the safety of drinking water and wastewater systems. 6. This Module provides students with an understanding of air pollution, its sources, types, effects, and the engineering solutions used to control air quality and mitigate harmful emissions. 7. This Module covers the issue of global atmospheric change, including climate change, global warming, and the role of engineering in addressing these environmental challenges through mitigation and adaptation strategies. 8. This Module focuses on solid waste management and resource recovery, teaching students how to design and implement waste management systems and how to recover valuable resources from waste materials. 9. This module provides students with the opportunity to present their research or case studies, enabling them to apply theoretical knowledge to real-world environmental challenges and develop communication skills for professional settings.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this module, the student should be able to: 1. Demonstrate knowledge and understanding of the basic concepts related to water pollution, its sources, and its impact on ecosystems and human health. 2. Demonstrate a comprehensive understanding of scientific principles and methodologies related to water quality control, wastewater treatment technologies, and how these principles are applied in practical scenarios. 3. Describe the characteristics and functions of aquatic environmental systems, resource recovery techniques from solid waste, and the role of engineering in improving environmental sustainability. 4. Apply environmental chemistry principles to understand the behavior of pollutants and their interactions in the environment, as well as analyze the fate of these pollutants in different environmental media. 5. Analyze and understand global atmospheric changes and their effects on the environment, and identify the role of environmental engineering in mitigating the impacts of these changes. 6. Propose sustainable engineering solutions for air and water pollution problems and understand how environmental engineering techniques can be effectively applied to address these challenges. 7. Link theoretical knowledge with practical applications by analyzing case studies and applying engineering solutions to real-world environmental problems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Environmental Engineering. (2 hours) 2. Mass and Energy Transfer in Environmental Systems. (4 hours) 3. Environmental Chemistry: Basic Concepts and Principles. (4 hours) 4. Mathematical Modeling of Growth in Environmental Systems. (3 hours) 5. Water Pollution: Sources and Impacts. (3 hours)

	6. Water Pollution: Mitigation and Treatment. (4 hours) 8. Water Quality Control: Techniques and Practices. (5 hours) 9. Air Pollution: Sources, Impacts, and Control Methods. (4 hours) 10. Global Climate Change and Its Environmental Impact. (3 hours) 11. Solid Waste Management and Resource Recovery. (5 hours) 12. Environmental Engineering Solutions for Sustainable Practices. (4 hours) 13. Case Studies and Practical Applications in Environmental Engineering. (4 hours

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategy aims to provide students with a solid understanding of environmental engineering principles and methodologies. This will be achieved through lectures, practical sessions, and case studies. Students will apply these concepts through coursework assignments, enhancing their problem-solving, critical thinking, and analytical skills. The strategy focuses on linking theoretical knowledge with practical applications, preparing students to demonstrate their understanding effectively in the final examination.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	HW.	2	10% (10)	6,12	~~All~~
	Report	2	10% (10)	9,13	~~All~~
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction
Week 2	Mass and Energy Transfer
Week 3	Environmental Chemistry
Week 4	Environmental Chemistry-2
Week 5	Mathematics of Growth
Week 6	Water Pollution
Week 7	Water Pollution-2
Week 8	Summary & Midterm Exam
Week 9	Water Quality Control
Week 10	Water Quality Control-2
Week 11	Air Pollution
Week 12	Global Atmosphere Change
Week 13	Solid Waste Management and Resource Recovery
Week 14	(Presentation)
Week 15	Summary (or Special Lecture)

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	Gilbert M. Masters and Wendell P. Ela, "Introduction to Environmental Engineering and Science", Pearson New International Edition (3rd Ed.), 2014	yes
Recommended Texts		yes
Websites	Any web site talking about specific related materials.	

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Geology**		**Module Delivery**		
Module Type	**Support**		☐ **Theory**		
Module Code	**UOBAB0105025**		☒ **Lecture**		
ECTS Credits	**4**		☐ **Lab**		
SWL (hr/sem)	**100**		☒ **Tutorial** ☐ **Practical** ☐ **Seminar**		
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr. Wathiq Al-Jabban		**e-mail**	wathiq.aljabban@uobabylon.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	

Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	**1/9/2024**		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The primary goal of this module is to familiarize students with the various types of rock and rock formations, the weathering of rocks, the stress and deformation of rocks, and the engineering classification of rocks. They will also deal with the basic mineralogy of rocks. 2. The second primary goal of this course is to familiarize students with the basic concepts of soils, including engineering classification, index properties, texture, soil gradation, compaction, consolidation, stress, and deformation. The third goal is to understand the basic concepts of Geological maps, Topographic maps, contour lines, and map scale. In addition to the basic concept of the section.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students will be able to: 1. Understand the basic geological concepts and terminology. 2. Basic understanding of soil formation. 3. Explain the theory of plate tectonics. 4. Identify basic rock types and the properties of these rocks that an engineer may be concerned with. 5. Understand surface geological processes and their impact on engineering studies. 6. Understand internal geological processes (e.g. faults, earthquakes, volcanoes) and how they affect engineering studies. 7. Know how to read topographic maps and draw section profiles.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Geology, Rocks and Geological Processes Introduction to geological structures and processes. Rock types, folding and faults. Weathering, glaciation and coastal erosion. Part B – Classification of Soils Introduction to soil mechanics. Identification and description of engineering soils Part C – Physical properties and Compaction Density, water content, voids ratio, porosity, and degree of saturation. Particle size analysis, grading curves, and consistency limits. Part D – Stresses in Soils and Rocks Shear strength and stress-strain relationship.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course is taught as a lecture course with student participation. Classroom lectures are held to illustrate concepts. Student assignments are used to enhance concepts.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	53	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.53
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	Projects / Lab.	2	10% (10)	Continuous	
	Report	1	10% (10)	13	~~LO # 5, 8 and 10~~
Summative assessment	**Midterm Exam**	2 hr	10% (20)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (60)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction – the role of geology in environmental engineering
Week 2	The Rock Origin: Basic Mineralogy of Rocks
Week 3	Mineralogy Identification for Engineering Purposes
Week 4	Engineering classification; Rock strength, Rocks as engineering materials
Week 5	Weathering Processes of Rock
Week 6	Soil profiles, agricultural soil maps
Week 7	Engineering classification of soils, index properties, texture, soil gradation, compaction, consolidation, effective stress
Week 8	Physical and chemical properties of soils
Week 9	Multi-mineral Rocks
Week 10	Mechanical Properties & Deformations of Rocks
Week 11	Stress-Strain Relations for Rock Deformations
Week 12	Engineering classification of rocks
Week 13	Structural Geology, Stress, deformation, pore pressure, joints, and faults for granular materials
Week 14	Mass movement introduction, earthquakes, Strong ground motion
Week 15	Mapping Earth, Topographic Map, section profile

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering Geology, Second Edition (2007), F.G. Bell. Butterworth-Heinemann, Elsevier.	Yes
Recommended Texts	Engineering Geology Principles and Practice, (2009), David George Price. Springer-Verlag Berlin Heidelberg.	No
Websites	Engineering Geology (2022), Heinrich Ries, Thomas L Watson, John Wiley and Sons, Legare Street Press, ISBN-10: 1018491384	

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics III**		**Module Delivery**		
Module Type	**Core**		☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**		
Module Code	**ENV2301**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr. Fatimah Fahem Alkhafaji		**e-mail**	mat.fatimah.fahem@uobabylon.edu.iq	
Module Leader's Acad. Title	Assist. Prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	**1/9/2024**		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The first principal goal of this module is to help students become familiar with the polar coordinate system as another way to express coordinates in mathematics, along with the Cartesian system. They will also be exposed to methods for converting between points and equations in the two systems and plotting equations written in the polar system. 2. The second primary goal of this course is to familiarize the students with the notion of vectors as representing quantities that have directions as well as magnitude. For example, the velocity of a moving object in space is represented by a vector, specifying both its speed and direction of motion. Additionally, we will examine two important operations involving vectors: the scalar product and the cross product, along with their applications to linear geometry in space, including the equations of planes and the volume of a parallelepiped. 3. The third goal is to understand how the value of a multivariable function changes as one of its independent variables is allowed to vary, while all other variables remain constant. Hence, we will study the rate of change of a multivariable function with respect to each of its independent variables, introducing the notion of partial derivatives. We will then use these partial derivatives to get various local information about the function, including tangent planes and directional derivatives. Furthermore, we will develop various techniques, such as second derivative tests and Lagrange multiplier methods, to find local and global maxima and minima of a multivariable function.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students will be able to: 1. Effectively write mathematical solutions clearly and concisely. 2. Locate and use information to solve calculus problems. 3. Work effectively with others to complete homework and class assignments. This will be assessed through graded homework assignments and class projects and/or discussions. 4. Demonstrate ability to think critically by demonstrating an understanding for polar coordinate system and be able to compare it with cartesian system. 5. Demonstrate the ability to integrate knowledge and ideas of vector problems in a coherent and meaningful manner and use appropriate techniques for solving such problems. 6. Demonstrate an intuitive and computational understanding for partial derivative and its applications by solving a variety of problems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Polar Coordinates Relationship between polar and rectangular coordinates; Graphing in polar coordinates; Standard polar curves and equations; Areas and Lengths in Polar Coordinates [24 hrs.] Part B - Vectors Vectors representation; vector algebra operations; length of vectors; standard unit vector; The dot product – angles between vectors-perpendicular vectors – vector projection; The cross product – triple scalar-triple vector product; Lines and planes in space – vector equations of lines – line segments and planes. [20 hrs.] Part C – Partial Derivatives Partial derivatives of a function of two variables; Partial derivatives of a function of more than two variables; The Chain rule; extreme points. [16 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course is taught as a lecture course with student participation. Classroom lectures are held to illustrate concepts. Student assignments are used to enhance concepts.

Student Workload (SWL) الحمل الدراسي للطالب

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

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	HW.	2	10% (10)	6,12	~~All~~
	Report	2	10% (10)	9,13	~~All~~
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Polar coordinates: an Introduction
Week 2	Relationship between polar and rectangular coordinates
Week 3	Graphs in polar coordinates
Week 4	Standard polar curves and equations
Week 5	Area in polar coordinates
Week 6	Vectors – an Introduction
Week 7	Mid-term Exam + Vectors representation, addition, subtraction, and length of vector
Week 8	Standard unit vector, unit vector
Week 9	The dot product
Week 10	Vector Projection; Cross product
Week 11	Triple scalar product, triple vector product, vector equation of lines, line segments and planes
Week 12	Partial derivation – Partial derivatives of function of two variables
Week 13	Partial derivatives of function of more than two variables
Week 14	Chain rule
Week 15	Directional derivatives - Extreme points: maximum, minimum, and saddle points

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Thomas' Calculus; Early Transcendentals, 12th Ed.; based on the original work by G.B. Thomas; revised by M. Weir and J. Hass, Pearson.	Yes
Recommended Texts	James Stewart (2016). Multivariable Calculus. Cengage Learning.	No
Websites	https://ocw.mit.edu/courses/18-02-multivariable-calculus-fall-2007/	

Module Information معلومات المادة الدراسية					
Module Title	**Strength of Materials I**		**Module Delivery**		
Module Type	**Core**		☐ **Theory**		
Module Code	**ENV2302**		☒ **Lecture**		
ECTS Credits	**4**		☐ **Lab**		
SWL (hr/sem)	**100**		☒ **Tutorial**		
			☐ **Practical**		
			☐ **Seminar**		
Module Level	2		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr. Shereen Qasim Abdulridha		**e-mail**	eng151.shereen.qasim@uobabylon.edu.iq	
Module Leader's Acad. Title	Assist. Prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	**1/9/2024**		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Mechanics of materials is the study of how solid materials deform and fail due to various types of loads. In comparison, statics and dynamics focus on particles and rigid bodies that do not deform or fail. 2. Stress and strain are the fundamental concepts that span the entire course. Stress is the intensity of internal force. Materials often fail due to the most significant stresses that develop in an object. Strain is the intensity of deformation. The deformation of a structure can be just as important as the stresses in it. 3. Engineering students typically take this course in the second half of their second year. It follows statics and can be taken before or after dynamics. It incorporates almost all of the concepts covered in statics, including equilibrium, internal

	forces and moments, centroids, and area moment of inertia. 4. Engineers are problem solvers who deal with many uncertainties as they attempt to balance the cost, size, weight, etc. of structures and machines with safety. Many formulas and rules for design found in engineering codes and specifications are based on mechanics-of-materials concepts, so what you learn in this course will be helpful throughout your career in engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The mechanics of materials is best learned by working through problems. The book's narrative helps you build the conceptual understanding needed to solve problems. The commentary within the example problems explains the rationale behind each step in the solution process, while the illustrations help build the mental imagery necessary to apply the concepts to new situations. The homework problems, which span a range of difficulty levels, reinforce the course concepts. They help build the technical foundation and skills needed in subsequent engineering courses. They are designed to be both challenging and practical.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Time-on-task is the key to success in this class. The topics are based on statics and each other, so it may be helpful to refer back to your statics book and prior homework occasionally. Please place equal importance on learning the concepts as on the solution steps. Many people attempt to navigate the class by memorizing a series of steps. This approach does not work well because the problems are intentionally designed to shuffle the required steps. This mimics the complex problem-solving environment in which engineers work. Try to understand why a specific step is necessary and then learn how to implement it. When presented with a new problem, this will help you compare all of the possible steps that could be taken and decide which is the most appropriate to begin with. There are several methods for handling units in this course. Your instructor can help you with this. They probably have a preferred method based on years of experience. It is essential to select a technique and consistently adhere to it. As you learn about the various kinds of stress and strain, try to remember what they look like. This will help you more intuitively understand their associated formulas. It will also help near the end of the semester as you combine all of them.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.66
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	HW.	2	10% (10)	6,12	~~All~~
	Report	2	10% (10)	9,13	~~All~~
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Stress
Week 2	Stress
Week 3	Strain
Week 4	Strain
Week 5	Mechanical Properties of Materials
Week 6	Mechanical Properties of Materials
Week 7	**Mid-term Exam**
Week 8	Design Concepts
Week 9	Axial Deformation
Week 10	Axial Deformation
Week 11	Axial Deformation
Week 12	Axial Deformation
Week 13	Torsion
Week 14	Torsion
Week 15	Torsion

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Philpot, Mechanics of Materials: An Integrated Learning System, 5e	No
Recommended Texts	Strength of Materials 4th Edition by Pytel and Singer	Yes
Websites		

Module Information معلومات المادة الدراسية

Module Title	Fluid Mechanics I	Module Delivery
Module Type	Core	☐ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	ENV2303	
ECTS Credits	5	
SWL (hr/sem)	125	

Module Level	2	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Dr. Udai Adnain Jahad	**e-mail**	eng.udai.jahad@uobabylon.edu.iq
Module Leader's Acad. Title	Asst.Prof.	**Module Leader's Qualification**	Ph.D.
Module Tutor	Dr. Udai Adnain Jahad	**e-mail**	eng.udai.jahad@uobabylon.edu.iq
Peer Reviewer Name	Dr. Udai Adnain Jahad	**e-mail**	eng.udai.jahad@uobabylon.edu.iq
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- This Module focuses on establishing a strong foundation for students in the second grade of fluid mechanics 2- This Module provides a basic understanding of fluid properties and flow characteristics and reviews the laws learned in the previous stage. 3- This Module assists students to understand how to apply these laws to other applications and explore related topics. 4- This Module aims to provide an understanding of hydrostatic pressure forces on plane surfaces and curved surfaces submerged in liquid. 5- Also, it aims to provide knowledge of Buoyancy and flotation 6- This Module deals with Fluids in motion: the Bernoulli equation and the energy equation 7- This Module aims to an understanding of dimensional analysis & dynamic similitude 8- It also provides students with practical and scientific applications and how to interpret them from a scientific perspective. 9- This Module aims to link the theoretical material to the practical material and give students the opportunity to draw conclusions from what they have learned.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this module the student should be able to: 1- Demonstrate knowledge and understanding of the fundamentals of fluid properties and their various applications in engineering. They will be exposed to the fundamentals of fluid mechanics and the physical phenomena associated with flow, including viscosity, friction, compressibility and turbulence. 2- Understanding the hydrostatic and buoyancy forces. They learn about how different surfaces can exert hydrostatic forces and the effects of buoyancy forces on different materials. 3- The student strongly understands the principles of fluid dynamics and the relevant laws that dictate the motion of liquids and gases. They are well-versed in the topics of conservation of mass, energy, and momentum, as well as the mathematical equations that describe the flow of fluids. 4- Understand and apply concepts of hydrostatic pressure to problems on plane surfaces and curved surfaces submerged in liquid. 5- Understanding of dimensional analysis & dynamic similitude
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1- Introduction of fluid mechanics: What are we meaning by Fluid Mechanics? And a system of units. (2hr) 2- Fluid Properties: Review of the properties of liquid fluids, Mass density, weight density, specific volume, specific gravity, viscosity, surface tension, and capillarity. (6hr) 3- Fluid Statics: Pressure Units, Variation of Pressure in a Fluid; Pressure Measurements; Pressure Measurement Devices, Pressure Forces on Surfaces. (8hr) 4- Hydrostatic: forces on planes and curved surfaces submerged in fluids. (6hr) 5- Buoyancy forces (stability of submerged and floating bodies). (4hr) 6- Fluid kinematics (streamlines and continuity). (4hr) 7- Fluid dynamics (Bernoulli's equation, flow through orifices, venturi meter). (4hr) 8- Hydraulic and energy grade lines. (3hr) 9- Applications of Bernoulli's equation (flow through an orifice, syphon, pitot tube, venturi meter, pumps and turbines). (4hr) 10- Dimensional analysis and the law of similarity. (4hr)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The assessment strategy is designed to provide students with the opportunity to demonstrate an understanding of scientific principles, methodologies, expand their critical thinking skills, and apply mathematical methods, as well as the ability to describe particular systems and processes in the final examination. This will be achieved through classes, interactive tutorials, and coursework elements that enable students to demonstrate their ability to interpret a problem and present a solution clearly and accurately.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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

Formative assessment	**Quizzes**	2	10% (10)	5, 10	~~LO #1, 2, 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 of fluid mechanics
Week 2	Fluid Properties
Week 3	Fluid Statics
Week 4	Fluid Statics
Week 5	Hydrostatic
Week 6	Hydrostatic
Week 7	**Mid-term Exam**
Week 8	Buoyancy forces
Week 9	Fluid kinematics
Week 10	Fluid kinematics and Fluid dynamics
Week 11	Fluid dynamics
Week 12	Hydraulic and energy grade lines
Week 13	Applications of Bernoulli's equation
Week 14	Applications of Bernoulli's equation and Dimensional analysis
Week 15	Dimensional analysis and the law of similarity

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Fluid Prosperities: Viscosity **(2hr)**
Week 2	Lab 2: Fluid Prosperities: Measurement of Capillary Elevation **(2hr)**
Week 3	Lab 3: Calibration of Pressure Gage (Bourdon Type) **(2hr)**
Week 4	Lab 4: Use of Manometer to Measure Pressure **(2hr)**
Week 5	Lab 5: Use of Manometer to Measure Pressure **(2hr)**
Week 6	Lab 6: Centre of Pressure on a Submerged Plane Surface **(2hr)**
Week 7	Lab 7: Centre of Pressure on a Submerged Plane Surface **(2hr)**
Week 8	Lab 8: Verification of Archimedes' principle **(2hr)**
Week 9	Lab 9: Verification of Archimedes' principle **(2hr)**
Week 10	Lab 10: Impact of Jet **(2hr)**
Week 11	Lab 11: Verification of Bernoulli's' Theorem **(2hr)**
Week 12	Lab 12: Verification of Bernoulli's' Theorem **(2hr)**
Week 13	Lab 13: Regimes of Flow by Reynolds Experiment **(2hr)**
Week 14	Lab 14: Prepare for the final exam **(2hr)**
Week 15	Lab 15: Final exam **(2hr)**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Vennard, J.K., 2011. ***Elementary fluid mechanics***. Read Books Ltd.	Yes
Recommended Texts	Pritchard, P.J. and Mitchell, J.W., 2016. *Fox and McDonald's* ***introduction to fluid mechanics***. John Wiley & Sons.	Yes
Websites	https://www.coursera.org/search?query=fluid%20mechanics&	

Module Information معلومات المادة الدراسية					
Module Title	**Environmental Protection I**			**Module Delivery**	
Module Type	**Core**			☐ **Theory**	
Module Code	**ENV2305**			☒ **Lecture**	
ECTS Credits	**5**			☐ **Lab**	
SWL (hr/sem)	**125**			☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	2		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr. Rawaa Hussein Kadhim Al-Isawi		**e-mail**	Eng.rawaa.alisawi@uobabylon.edu.iq	
Module Leader's Acad. Title	Asst. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Rawaa Hussein Kadhim Al-Isawi		**e-mail**	Eng.rawaa.alisawi@uobabylon.edu.iq	
Peer Reviewer Name	Dr. Rawaa Hussein Kadhim Al-Isawi		**e-mail**	Eng.rawaa.alisawi@uobabylon.edu.iq	
Scientific Committee Approval Date	**1/9/2024**		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course focuses on the principles and practices of environmental protection, aiming to develop students' skills and cognitive understanding of sustainability, pollution control, and conservation. It emphasizes the use of clear and precise language to communicate environmental issues and solutions effectively. (Note the attached appendices.) 1- This course provides a comprehensive understanding of environmental protection, focusing on pollution control, water quality assessment, waste management, and air pollution prevention. Students will develop skills in analyzing water and air quality, understanding pollutant dispersion models, and applying key environmental formulas such as the Streeter-Phelps equation. The course also covers self-purification processes, solid waste management, and the impact of heating pollution, ensuring a well-rounded approach to environmental sustainability.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	2- Environmental protection is essential in modern society as it impacts health, sustainability, and the overall quality of life. It plays a vital role in managing resources, reducing pollution, and ensuring clean air and water for future generations. Educating students in environmental protection is crucial, as it enhances their understanding of ecological balance and the impact of human activities on the natural world. It provides them with the tools to analyze environmental issues, implement sustainable solutions, and develop practical skills to address challenges such as waste management, pollution control, and resource conservation in daily life. 3- That the student understands the fundamental concepts of environmental protection. 4- Learn how to identify environmental problems and explore possible solutions. 5- Enabling students to assess and manage environmental sustainability projects.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Visualization and Representation: Visualize and represent engineering systems and their behaviors using appropriate diagrams, schematics, and other graphical tools, facilitating effective communication of ideas and analysis. Critical Thinking: Analyze and evaluate engineering problems from multiple perspectives, considering the limitations and assumptions of engineering models and making informed decisions based on available data

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The teaching and learning strategies vary to include a mix of traditional and modern methods aimed at enhancing students' understanding and developing their skills. These include: 1. Lectures that cover the fundamental concepts of the subject being taught in the semester. Various educational tools are used to enhance students' understanding, including traditional presentations and diagrams, to clarify complex concepts. 2. Engaging students in the learning process through group discussions, problem-solving, and reports submitted by the students on the subject. 3. Training students to apply concepts through assignments and exercises. 4. Continuous assessment of students, which includes short quizzes, in-class assignments, and homework.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	HW.	2	10% (10)	6,12	~~All~~
	Report	2	10% (10)	9,13	~~All~~
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Environmental Pollution and Control
Week 2	Water Quality for Drinking Usage
Week 3	Water Quality for Industrial and Agricultural Usage
Week 4	Surface Water Pollution, Types of Pollutants
Week 5	Self-Purification, BOD
Week 6	Streeter-Phelp's formula and Oxygen Sag Curve
Week 7	Solid Waste detention and properties
Week 8	Solid Waste management and disposal
Week 9	Heating Pollution Control, Sources, Effects and Dispersion
Week 10	Lake Pollution and Productivity Level
Week 11	Introduction to Air Pollution
Week 12	Indoor Air Quality Model, Line- Source Dispersion Model
Week 13	Area- Source Dispersion Model
Week 14	Prevention of Air Pollution
Week 15	Engineering applications

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

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Zehnder, Caralyn; Manoylov, Kalina; Mutiti, Samuel; Mutiti, Christine; VandeVoort, Allison; and Bennett, Donna, "Introduction to Environmental Science: 2nd Edition" (2018). Biological Sciences Open Textbooks. • Environmental protection: what everyone needs to know / Pamela Hill. Description: Oxford; New York, NY: Oxford University Press, 2017	Yes
Recommended Texts	• Environmental science: S.C. Santra: New Central Book Agency (P.) Ltd. Kolkata,2019 • Environmental chemistry: A.K. De: New Age International (P) Ltd., Publishers India, 2020.	No
Websites		

Module Information معلومات المادة الدراسية					
Module Title	**Surveying Engineering**		**Module Delivery**		
Module Type	**Core**		☐ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**		
Module Code	**ENV2304**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Mustafa Abdul-Kareem		**e-mail**		
Module Leader's Acad. Title	Asst. Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Mustafa Abdul-Kareem		**e-mail**		
Peer Reviewer Name	Mustafa Abdul-Kareem		**e-mail**		
Scientific Committee Approval Date	**1/9/2024**		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course aims to develop curricula to conform with advanced international experiences in building teaching programs according to modern scientific methods that simulate the requirements of development and the survey labor market through the use of high-quality and advanced devices such as satellites, aerial surveys, etc., and methods of processing and opening other horizons to study topics related to the most important scientific applications and their interpretation Within a correct scientific perspective by reviewing the current year's curriculum and how to deal with it. **1.** This course focuses on establishing a strong foundation for students in the second grade of surveying engineering. **2.** This course provides a basic understanding of surveying concepts including leveling definitions, equipment, instrument adjustment, the principle of leveling, sources of error, closure tolerances, precise leveling, and digital leveling. **3.** This course assists students to understand the principles of measuring fieldwork including measurement units for length, area, and volume, and how to convert the units of them. **4.** This course aims to provide knowledge of computing distance adjustment, determine errors in taping, and method of using electromagnetic distance measurement (EDM). **5.** This course focuses on types of angles and methods of measuring angles and learning students how to convert one angle type to another. **6.** It also aims to understand Instrumental errors, instrument adjustment, field procedure, and sources of error, Systematic error. **7.** This course provides a basic understanding of differential leveling adjustment using direct differential leveling methods. **8.** This course assists students to understand how to calculate measuring areas by different methods. **9.** This course aims to understand correction the elevations for distributing closure errors. **10.** This course provides a basic understanding of calculating cross-sections area for regular and irregular shapes. **11.** It aims to provide knowledge of computing earthwork works volume of cross-sections of regular and irregular, and computation of cumulative volume. **12.** It also provides students with practical and scientific applications and how to interpret them from a scientific perspective. **13.** This course aims to link the theoretical material to the practical material and allow students to conclude from what they have learned.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The course introduces to the students the science of surveying, which investigates the different ways of representing the Earth's surface, through which it is possible to measure horizontal and vertical distances between points and to measure horizontal and vertical angles between lines and points, as well as to determine the directions of the lines. The student is acquainted with the survey work and the advanced devices that guarantee the completion and treatment of important engineering projects to contribute directly to acquiring the necessary skills for this specialization. **A. knowledge and understanding** • Preparing the student to receive the science of surveying, which investigates the different ways of representing the Earth's surface. • Take advantage of linking topics with mathematical solutions to solve them accurately. • Refining the scientific concept and consolidating the scientific material correctly through continuous examinations and activating the student's role not in obtaining the degree, but in understanding and benefiting from this material to the maximum extent. **b. Subject-specific skills** • Preparing the student for his future life by adopting modern methods of solving surveying engineering problems. • The student's ability to measure and apply the primary purpose of surveying in engineering works. Enabling students to supervise engineering projects.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Understanding the basic concepts of surveying includes definitions of leveling, equipment, instrument adjustment, the principle of leveling, sources of error, closure tolerances, precise leveling, and digital leveling [4 hours].

	2. Understanding of tape measuring includes fieldwork, distance adjustment, errors in taping, accuracy, electromagnetic distance measurement (EDM), measuring principles, other error sources, instrument specifications, measurement units (length, area, volume), and unit conversion [8 hours]. 3. Understanding of Instrumental errors, instrument adjustment, field procedure, sources of error, and calculating systematic error [4 hr.]. 4. Understanding of Angles and their types. Methods of measuring angles and the relationship between angles. Instrumental errors. Instrument adjustment, convert angle type to another [4 hr.]. 5. Understanding of Leveling–Definitions, curvature and refraction, equipment, instrument adjustment, leveling applications, reciprocal leveling, precise leveling, digital leveling [4 hr.]. 6. Understanding the Adjustment of Differential Leveling. Adjustment of readings for direct differential leveling methods. Distribution of closure error. Correct the elevation of the closure error. [8 hr.]. 7. Methods of measuring area. Calculating simple figure areas (for different shapes). Calculating Areas by offsets from straight lines. Regularly spaced offsets. Average offset formula. Trapezoid formula. Area by Simpson rule. Area by irregularly spaced offsets. Area by coordinates area method [8 hr.]. 8. Understanding of the cross-sectional area. Longitudinal Section. Latitude section. Methods of Calculating Cross-Section Area [8 hr.]. 9. Understanding of Earthwork Works Volume of Cross-Sections. Average End-Area Method. Prizimoidal Method. Earthwork Works Volume of Cross-Sections. Average End-Area Method. Prizimoidal Method. Computation volume. The volume of Geometric Shapes. The volume of Irregular Shapes. Computation of Cumulative volume [12 hr.]. All the above items are measured by assessing students using homework, quizzes, and tests.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Subject-specific skills The student is familiar with survey work and advanced devices that ensure the completion and treatment of essential engineering projects, directly contributing to the acquisition of the necessary skills for this specialization. Teaching and learning methods. 1. The method of lecturing 2. Team Project 3. Practical training 4. Learning Technologies on Campus.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	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	Surveying types. Basic Principles of Surveying. Importance of Surveying
Week 2	Measuring principles. Units of measurement. Meteorological corrections. Vertical control.
Week 3	Distance: Methods of measuring distances. Traditional Tools of Measuring Horizontal Distances. Other uses of the tape. Electromagnetic distance measurement (EDM).
Week 4	Styles of measuring horizontal distances using a measuring tape. Styles of measuring horizontal distances using a measuring tape. Sources of error in taping. Mistakes. Random and Systematic errors.
Week 5	Leveling. Leveling purposes. Definitions of main terms.Calculate the elevation of differential leveling using the leveling staff.
Week 6	Leveling: Methods and type of leveling. Types of leveling instruments. Level staff (leveling rod). Differential leveling. Definitions. Profile leveling. Staking and station the reference line. Profile types. Correction of the elevations of the profile.
Week 7	**Mid-term Exam.**
Week 8	Angles: Types of angles. Methods of measuring angles. The relationship between angles. Instrumental errors. Instrument adjustment. Convert the angle type to another.
Week 9	Adjustment of differential leveling. Adjustment of readings for direct differential leveling methods. Distribution of closure error. Correction elevation of closure error.
Week 10	Area. Methods of measuring area. Calculating of simple figures areas (for different shapes). Calculating Areas by offsets from straight lines. Regularly spaced offsets. Average offset formula. Trapezoid formula.
Week 11	Area by Simpson rule. Area by irregularly spaced offsets. Area by coordinates area method. Cross-sections area. Longitudinal section and latitude section. Methods of calculating cross-section area.
Week 12	Earthwork Works Volume of Cross-Sections.
Week 13	Average End-Area Method. Prizimoidal Method.
Week 14	Computation volume. The volume of Geometric Shapes. The volume of Irregular Shapes.
Week 15	Computation of Cumulative volume.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Measuring a distance using the measuring tape.
Week 2	Lab 2: Establish a column on a straight line from a point on it.
Week 3	Lab 3: Establish a column on a straight line from a point located outside of it.
Week 4	Lab 4: Measuring a horizontal angle. Establishing a horizontal angle in a site.
Week 5	Lab 5: Training on electronic distance measurement (EDMs).
Week 6	Lab 6: Study of level and leveling staff.

Week 7	Lab 7: Leveling Device Training.
Week 8	Lab 8: Training on the increase of magnification telescope. Bubble Tube Sensitivity.
Week 9	Lab 9: Differential Leveling. The Adjustment of Leveling Reading.
Week 10	Lab 10: Closed loop leveling.
Week 11	Lab 11: Lab 6: Longitudinal leveling of a road.
Week 12	Lab 12: The Adjustment of Leveling Reading.
Week 13	Lab 13: Theodolite Device Training.
Week 14	Lab 14: Total Station Device Training.
Week 15	Lab 15: Layout for given plan of building.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**1-** Engineering Surveying, Yassin Ubaid, 1990, Basra University **2-** DEPARTMENT OF THE ARMY, U.S. Army Corps of Engineers, CECW-EP Washington, 1994. **3-** GPS satellite surveying / Alfred Leick. —3rd ed., 2004, Canada.	Yes
Recommended Texts	Ghilani, D.G. and Wolf, P.R. 2012. Elementary Surveying an Introduction to Geomatics. Thirteen edition, Pearson Education, Inc., Upper Saddle River, New Jersey, Manufactured in the United States of America.	No
Websites	https://www.coursera.org/search?query=fluid%20mechanics&	

Module Information معلومات المادة الدراسية					
Module Title	**Arabic Language II**		**Module Delivery**		
Module Type	**Basic**		☐ **Theory**		
Module Code	**UOBAB2001**		☒ **Lecture**		
ECTS Credits	**2**		☐ **Lab**		
SWL (hr/sem)	**50**		☐ **Tutorial** ☐ **Practical** ☐ **Seminar**		
Module Level	2	**Semester of Delivery**		1	
Administering Department	Type Dept. Code	**College**	Type College Code		
Module Leader	Heba Mohammed Sakban	**e-mail**			
Module Leader's Acad. Title	Assist. Lecturer	**Module Leader's Qualification**		MSc	
Module Tutor		**e-mail**			
Peer Reviewer Name		**e-mail**			
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The aims of the subject Building Materials are to provide students with a comprehensive understanding of various building materials, their properties, characteristics, and applications in construction. Here are the common aims of a Building Materials module:
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After this term of learning Arabic, students will be able to obtain a "general use" of the language; they will achieve the following: • Write and read Arabic almost perfectly, even without using vowel signs. • Understand much of the standard Arabic language by listening, as well as, depending on student skills, a basic level of speaking (standard language, not dialect). • Read, understand, analyze and translate moderate Arabic texts and a wide range of primary historical resources. • Get essential basics for further learning of the language in the future. Besides gaining a massive basic knowledge of the language, students will also get insight into some features of Islamic culture, especially Arab culture. This will lead to an understanding of the environment in which the source material, written in Arabic, originated. Participants' abilities in Arabic will be assessed through a short quiz (15-20 minutes) every two weeks and a final examination at the end of the semester.
Indicative Contents المحتويات الإرشادية	Each class will begin with a brief review of the material learned in the previous lessons. Then, we will review the assigned homework, continue learning grammar and practicing grammatical rules, read various texts, and finally (depending on the time remaining) train the oral use of the language. Regular homework will be set; students should count on successful participation in this class, requiring at least triple the amount of time outside the classroom than inside the classroom. Students will also be able to listen to Arabic voice recordings, allowing them to distinguish different Arabic pronunciations. Speaking practices help gain insight into the dialects of Arabic.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Introduce students to building materials' fundamental concepts and principles, including their types, properties, and composition. This includes understanding the relationship between material properties and their behaviour in different construction applications.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	HW.	2	10% (10)	6,12	~~All~~
	Report	2	10% (10)	9,13	~~All~~
Summative assessment	Midterm Exam	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Verbs
Week 2	Names
Week 3	singular, dual and plural
Week 4	Non-declinable noun
Week 5	Identifying and distinguishing different types of words in Arabic.
Week 6	Writing numbers correctly in both feminine and masculine forms.
Week 7	Recognizing definite and indefinite nouns and their classifications.
Week 8	Strengthening expression skills and logical reasoning.
Week 9	Understanding singular and plural grammatical rules.
Week 10	Avoiding colloquial and foreign words in formal writing.
Week 11	Building confidence in public speaking.
Week 12	Eliminating errors in eloquent Arabic writing.
Week 13	Cultivating creativity and proficiency in Arabic calligraphy.
Week 14	Enhancing students' ability to compose and produce written texts.
Week 15	Understanding the unique advantages of the Arabic language compared to others.

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Fawzieh A. Bader: Al-Asas for Teaching Arabic for Non-Native Speakers. Part 1 (Beginner Level). Noorart Inc. 2010. 2. Kristen Brustad - Abbass al-Tonsi - Mahmoud al-Batal: Al-Kitaab fii Taallum al-Arabiyya with DVDs. Parts I-II. Georgetown University Press. DVDs are included. 3. Schulz, Krahl, Reuschel: Standard Arabic. An elementary-intermediate course. Cambridge University Press, 2000 (for grammar).	No
Recommended Texts	4. Karin C. Ryding: A Reference Grammar of Modern standard Arabic. Cambridge University Press, 2005 (complementary material). 5. A. F. L. Beeston: The Arabic Language Today. Hutchinson & Co Ltd, 1970. 6. Adam Gacek: Arabic Manuscripts. A Vademecum for Readers. Brill, 2009.	No
Websites	Any web site talking about specific related materials.	

Module Information معلومات المادة الدراسية					
Module Title	Crimes of the defunct Baath Party			Module Delivery	
Module Type	Basic			☐ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOBAB2301				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	2		Semester of Delivery	1	
Administering Department	Type Dept. Code		College	Type College Code	
Module Leader	Rabab Naji Abdel Attia		e-mail		
Module Leader's Acad. Title	Assist. Lecturer		Module Leader's Qualification	MSc	
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	1/9/2024		Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The study of the war crimes of the defunct Baath Party, especially in the context of Iraq, seeks to achieve several essential objectives. These objectives can be summarized in the following points: 1. Documenting the facts: The main objective is to collect and document information related to the crimes committed by the Baath regime, including mass executions, torture, genocide (such as the Anfal campaign), and chemical attacks (such as the attack on

	Halabja). Documenting these crimes is essential to preserving an accurate and fair historical memory. 2. Achieving justice: By collecting evidence and testimonies, these studies aim to bring those involved in the crimes to justice, whether they are political leaders, military personnel, or security personnel. Transitional justice is an essential part of this process, as it seeks to hold those responsible accountable and ensure that there is no impunity. 3. Compensating victims: A key objective is to provide both material and moral compensation to victims and their families. The study contributes to identifying those affected and their needs, enabling the implementation of fair and comprehensive compensation programs. 4. Education and awareness: Documenting crimes and publishing the study's findings contribute to raising awareness among current and future generations about the atrocities of dictatorships and the importance of respecting human rights. These studies can also be used in educational curricula to prevent the recurrence of such crimes. 5. National reconciliation: Some studies aim to contribute to the national reconciliation process after the Baath regime era. By revealing the truth and holding those involved accountable, trust can be built between affected communities, enabling them to work together to overcome the effects of previous crimes. 6. Academic and political research: The studies provide an information base for academics and policymakers to understand the nature of crimes committed by the regime, analyze their causes and consequences on Iraqi society and the region as a whole. These goals require comprehensive work and coordinate efforts between legal authorities, international organizations, and researchers to ensure that justice is achieved and that such crimes are not repeated.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand theoretical debates about the Crimes of the defunct Ba'ath Party. 2. Demonstrate knowledge of the work of key political theorists on the Crimes of the defunct Ba'ath Party 3. Critically engage with this work.
Indicative Contents المحتويات الإرشادية	The course will be divided into three sections. The first section will explore the question of what it means to be radical today, including the notion of critique (Boltanski), the broader concept of radicalization, left and right variations, the political context, and manifestations worldwide. The second section will trace the intellectual trajectory of radical democracy in the Marxist and post-structuralist traditions. The last section will examine popular theories of radical democracy, including Hardt and Negri, Laclau and Mouffe's concept of counterhegemony, Graeber's, Lash, etc. notion of post-hegemony, and more recent revivals of communism (Zizek, Bosteels and Jodi Dean). The last section will align theories with particular themes eliciting visions of renewal and change (for example, neoliberalism; equality, etc.).

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Learning outcomes of the Iraqi Baath Party Crimes course aim to provide students with knowledge and a deep understanding of the nature of the crimes committed by the defunct Iraqi Baath Party regime. Among the main outcomes that a student can expect from studying this course are: 1. Understanding the historical and political context: •Familiarity with the political history of Iraq during the Baath Party rule (1968-2003) and the events that led to the commission of these crimes. •Understanding the ideological foundations of the Baath Party and how they contributed to justifying repression and violations against various segments of the Iraqi people. 2. Identifying the types of crimes committed: •Identifying and classifying the types of crimes committed by the regime, including crimes against humanity, genocide, and war crimes. •Studying concrete examples such as the Anfal campaign against the Kurds, mass executions of political opponents, and the chemical attack on the city of Halabja. 3. Analysis of the impact of crimes on Iraqi society: •Assessing the social, economic and political impact of crimes on Iraqi society, especially on ethnic and religious minorities, such as Kurds and Shiites. •Understanding the impact of policies of repression and persecution on the Iraqi social fabric and the political environment after the fall of the regime. 4. Ability to evaluate legal frameworks: •Knowledge of international laws related to war crimes and crimes against humanity and how they apply to crimes committed by the Baath regime. •Analyzing national and international efforts to bring those responsible for these crimes to justice, including the role of the Iraqi High Criminal Court and international courts. 5. Enhancing critical thinking: •Developing the ability to think critically and systematically analyze historical and political events related to the regime's crimes. •Understanding the internal and external factors that contributed to the continuation of repression and the avoidance of international trials for a long time. 6. Interaction with sources of information and testimonies: •Acquiring research skills in primary and secondary sources of information on crimes, such as live testimonies, historical documents, and reports of human rights organizations. •Analyzing and evaluating the credibility of historical sources and determining the best methods for their use in academic research. 7. Understanding the importance of transitional justice: •Studying the principles of transitional justice and how they can be applied in post-conflict situations such as Iraq after the fall of the Baath regime. •Identifying the role of truth and reconciliation committees and compensation programs for victims and their importance in achieving social and political stability. 8. Preparing students to work in the fields of human rights and justice: Qualifying students to be able to contribute to the field of transitional justice and human rights, whether through working in human rights organizations, or in related legal fields.

Student Workload (SWL) الحمل الدراسي للطالب			
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	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية

As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	HW.	2	10% (10)	6,12	~~All~~
	Report	2	10% (10)	9,13	~~All~~
Summative assessment	Midterm Exam	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	A descriptive overview of the political systems in Iraq (1921-2003)
Week 2	Violations of public rights and freedoms by the Baath regime
Week 3	The impact of behaviors on society and its influence on the state
Week 4	The impact of the transitional phase in combating authoritarian politics
Week 5	Psychological field
Week 6	Social field
Week 7	Religion and State
Week 8	Culture, Media and the Militarization of Society
Week 9	The impact of oppression and wars on the environment and population
Week 10	Use of internationally prohibited weapons and environmental pollution
Week 11	scorched earth policy
Week 12	Drying of marshes and forced migration
Week 13	Destruction of the agricultural and animal environment and radioactive pollution
Week 14	Mass graves and bombing of places of worship
Week 15	Preparing for the final exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**The curriculum of the crimes of the banned defunct Ba'ath Party**	Yes
Recommended Texts		
Websites		

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Statistics**			**Module Delivery**	
Module Type	Support			☐ **Theory**	
Module Code	**ENV2306**			☒ **Lecture**	
ECTS Credits	**3**			☐ **Lab**	
SWL (hr/sem)	**75**			☒ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	2	**Semester of Delivery**		1	
Administering Department	Type Dept. Code	**College**	Type College Code		
Module Leader	Dr. Isra'a Sadi Abdul-Amir Samaka	**e-mail**	eng.israa.sadi@uobabylon.edu.iq		
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**		Ph.D.	
Module Tutor	Dr. Isra'a Sadi Abdul-Amir Samaka	**e-mail**	eng.israa.sadi@uobabylon.edu.iq		
Peer Reviewer Name	Dr. Isra'a Sadi Abdul-Amir Samaka	**e-mail**	eng.israa.sadi@uobabylon.edu.iq		
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1- To develop problem-solving skills and understanding of engineering statistics theory through the applications. 2- This course covers the fundamental concepts of engineering statistics, making it a foundational subject for all environmental engineering courses. 3- The student determines the importance and justification for studying engineering statistics. 4- Providing the student with skills in organizing data in coordinated statistical tables, analyzing the results or drawing them graphically, and then analyzing the results using statistical theories and making appropriate decisions. 5- Providing the student with skills in applying statistical theories within the practical applications in the field of environmental engineering. 6- Providing the student with mental skills to deal with issues.
Module Learning Outcomes	By the end of this module, the student should be able to: 1- Demonstrate knowledge and understanding of the fundamentals of engineering statistics and its various applications in environmental engineering.

مخرجات التعلم للمادة الدراسية	2- Preparing for the student to receive a sober scientific subject. 3- Take advantage of connecting topics with equations to solve them in a correct manner. 4- Refining the scientific concept and consolidating the scientific course correctly through continuous examinations and activating the role of the student not in obtaining the degree, but in understanding and benefiting from this course to the maximum extent. The student learns about engineering statistics and how to deal with data and represent it in tables and graphs, and thus analyze it within modern statistical theories.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: 1. Fundamentals of statistics (Definitions, basic concepts): Knowing the importance and justification for studying engineering statistics and knowing the basic terms and concepts used. (2 hr) 2. Arranging and tabulated data: Organize, summarize and display data in tabular form. (2 hr) 3. Displaying data: Display and graphically represent data. (2 hr) 4. Measures of central location: Find the typical value of the data represented by the central value. (2 hr) 5. Measures of variation or dispersion: Knowing how the data spreads about the mean in the sample or population. (2 hr) 6. Elementary probability theory: Learn about probability theories and their practical applications. (2 hr) 7. Discrete and continuous distributions: knowing the special distributions and their use in practical applications and their suitability to the conditions of field data. (4 hr) 8. Sampling theory: Learn how to use sampling theory to determine the characteristics and characteristics of a population. (4 hr) 9. Estimation theory: Application of sampling theory to estimate the parameters of a community. (4 hr) 10. Statistical decision theory: Make appropriate decisions by accepting or rejecting a claim or hypothesis about the parameters of a statistical community. (4 hr) 11. Regression and correlation: The possibility of finding the value of a dependent variable from knowing the independent and thus knowing the amount of correlation between them. (2 hr)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The assessment strategy is designed to provide students with the opportunity to demonstrate an understanding of scientific principles, methodologies, expand their critical thinking skills, and apply mathematical methods, as well as the ability to describe particular systems and processes in the final examination. This will be achieved through classes, interactive tutorials, and coursework elements that enable students to demonstrate their ability to interpret a problem and present a solution clearly and accurately.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	HW.	2	10% (10)	6,12	~~All~~
	Report	2	10% (10)	9,13	~~All~~
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Fundamentals of statistics (Definitions, basic concepts)
Week 2	Arranging and tabulated data
Week 3	Displaying data
Week 4	Measures of central location
Week 5	Measures of variation or dispersion
Week 6	Elementary probability theory
Week 7	**Mid-term Exam**
Week 8	Discrete and continuous distributions
Week 9	Discrete and continuous distributions
Week 10	Sampling theory
Week 11	Sampling theory
Week 12	Estimation theory
Week 13	Estimation theory
Week 14	Statistical decision theory
Week 15	Regression and correlation

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Foreign references 1. Polikar R., 2006, "Probablity & statistics in engineering", Rowan University, Dept. of Electrical and Computer Engineering. 2. Freedman, D., Lane, D.1981, "Mathematical methods in statistics, First Edition, W.W. Norton & Company. Arabic references 1. M., S., Abu Salih, A., M., Awad, 1983, "Introduction to Statistics."	

	2. M., Al-Mashhadani, A., H., Mazhar, 1989, "Principles of Statistics", University of Baghdad. **3.** N., H., Emara, S., S., Tawfiq, 1989, "Statistics and its engineering applications".	
Recommended Texts		No
Websites	https://faculty.ksu.edu.sa/sites/default/files/probability_and_statistics_for_engineering_and_the_sciences.pdf	

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics IV**		**Module Delivery**		
Module Type	**Core**		☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**		
Module Code	**ENV2401**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	2	**Semester of Delivery**		1	
Administering Department	Type Dept. Code	**College**	Type College Code		
Module Leader	Dr. Fatimah Fahem Alkhafaji	**e-mail**	mat.fatimah.fahem@uobabylon.edu.iq		
Module Leader's Acad. Title	Assist. Prof.	**Module Leader's Qualification**		Ph.D.	
Module Tutor		**e-mail**			
Peer Reviewer Name		**e-mail**			
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1) The first principal goal of this module is to familiarize students with the double and triple integration of functions of two or more independent variables. Students will also be exposed to ways of how to multiply integrate functions in a polar coordinate system. 2) The second primary goal of this course is to help students become familiar with the mathematics of matrices, including finding determinants of matrices of order two or more. This course also aims to help students solve matrix problems, including addition, subtraction, and multiplication of matrices. Also, students will learn how to find the transpose and inverse of square matrices and how to use these concepts in solving sets of simultaneous linear equations. 3) The third goal is to understand how to solve infinite sequences and series problems, how to find their sums, and how to determine if those sequences converge or diverge. This course aims to help students understand and distinguish the different kinds of series such geometric, telescoping series, P-series, harmonic series and Taylor and Maclaurin series.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students will be able to: 1) Effectively write mathematical solutions in a clear and concise manner. 2) Locate and use information to solve calculus problems. 3) Work effectively with others to complete homework and class assignments. This will be assessed through graded homework assignments and class projects and/or discussions. 4) Demonstrate ability to think critically by demonstrating an understanding for multiple integration over rectangular and general regions in both cartesian and polar coordinate systems. 5) The ability to integrate knowledge and ideas of matrix problems in a coherent and meaningful manner and use appropriate techniques for solving sets of simultaneous linear equations. 6) Demonstrate an intuitive and computational understanding for infinite sequences and series by solving a variety of mathematical problems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Multiple Integrals Double integrals over rectangles; double integrals over general regions; double integrals in polar coordinates; triple integrals in cartesian form [20 hrs.] Part B - Matrices determinant of second order matrix; determinant of third and higher order matrix; properties of determinants; addition and subtraction of matrices; multiplication of matrices, transpose of matrix, inverse of square matrix; solution of simultaneous linear equations using Cramer's rule; solution of simultaneous linear equations using inverse matrix. [15 hrs.] Part C – Infinite Sequences and Series Infinite sequences; Calculating Limits of Sequences; Using L'Hôpital's Rule; Commonly Occurring Limits; infinite series; geometric series; The nth-Term Test for a Divergent Series; Telescoping series; P-series; Combining Series; series convergence or divergence; The integral test; Comparison test; Limit comparison test; The ratio and root tests; Alternating Series, Absolute and Conditional Convergence; Absolute and Conditional Convergence; Power Series; Power Series and Convergence; Operations on Power Series; Taylor and Maclaurin Series; Series Representations; Convergence of Taylor Series. [25 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course is taught as a lecture course with student participation. Classroom lectures are held to illustrate concepts. Student assignments are used to enhance concepts.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	HW.	2	10% (10)	6,12	~~All~~
	Report	2	10% (10)	9,13	~~All~~
Summative assessment	Midterm Exam	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Multiple integrals – Double integrals over rectangles + Double integrals over general regions
Week 2	Double integrals in polar coordinates
Week 3	Triple integrals in rectangular form
Week 4	Matrices – determinant of second order matrix
Week 5	Determinant of third and higher order matrix
Week 6	Helpful properties of determinants, Cramer's rule, addition and subtraction of matrices, multiplication of matrices, transpose of matrix, Inverse of square matrix
Week 7	Solution of set of linear equations
Week 8	Midterm exam
Week 9	Infinite Sequences
Week 10	Infinite series – geometric series - Telescoping series - P-series - arithmetic series - harmonic series - nth term test for divergence and convergence
Week 11	Integral Test – the comparison tests - the ratio test, the root test, alternating series, absolute and conditional convergence.
Week 12	Power series
Week 13	Operations on power series
Week 14	Taylor and Maclaurin series
Week 15	Convergence of Taylor series

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Thomas' Calculus; Early Transcendentals, 12th Ed.; based on the original work by G.B. Thomas; revised by M. Weir and J. Hass, Pearson.	Yes
Recommended Texts	James Stewart (2016). Multivariable Calculus. Cengage Learning.	No
Websites	https://ocw.mit.edu/courses/18-02-multivariable-calculus-fall-2007/	

Module Information معلومات المادة الدراسية					
Module Title	Strength of Materials II		Module Delivery		
Module Type	Core		☐ Theory		
Module Code	ENV2402		☒ Lecture		
ECTS Credits	5		☐ Lab		
SWL (hr/sem)	100		☒ Tutorial ☐ Practical ☐ Seminar		
Module Level	2	Semester of Delivery	2		
Administering Department	Type Dept. Code	College	Type College Code		
Module Leader	Dr. Shereen Qasim Abdulridha	e-mail	eng151.shereen.qasim@uobabylon.edu.iq		
Module Leader's Acad. Title	Assist. Prof.	Module Leader's Qualification	Ph.D.		
Module Tutor		e-mail			
Peer Reviewer Name		e-mail			
Scientific Committee Approval Date	1/9/2024	Version Number	1.0		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Strength of Materials I	Semester	3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Mechanics of materials is the study of how solid materials deform and fail due to various types of loads. In comparison, statics and dynamics focus on particles and rigid bodies that do not deform or fail. 2. Stress and strain are the fundamental concepts that span the entire course. Stress is the intensity of internal force. Materials often fail due to the largest stresses that develop in an object. Strain is the intensity of a deformation. The deformation of a structure can be just as important as the stresses in it. 3. This course is typically taken by engineering students in the second half of their second year. It follows statics and can be taken before or after dynamics. It incorporates almost all of the concepts covered in statics, including equilibrium, internal forces and moments, centroids, and area moment of inertia.

	4. Engineers are problem solvers who deal with many uncertainties as they attempt to balance the cost, size, weight, etc. of structures and machines with safety. Many formulas and rules for design found in engineering codes and specifications are based on mechanics-of-materials concepts, so what you learn in this course will be useful throughout your career in engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Mechanics of materials is best learned by working problems. The book narrative helps you build the conceptual understanding needed to solve problems. The commentary within the example problems describes the rationale for each step in the solution process, while the illustrations help build the mental imagery needed to transfer the concepts to new situations. The homework problems, which span a range of difficulty levels, reinforce the course concepts. They help build the technical foundation and skills needed in subsequent engineering courses. They are designed to be challenging and, at the same time, practical.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Time on task is the key to this class. The topics build on statics and on one another, so it may be helpful to occasionally refer back to your statics book and previous homework. Please place as much importance on learning the concepts as you do on the solution steps. Many people try to navigate the class by memorizing a series of steps. This approach is ineffective because the problems are intentionally designed to shuffle the required steps. This mimics the complex problem-solving environment that engineers encounter. Aim to understand why a specific step is necessary and how to execute it. When faced with a new problem, this understanding will allow you to evaluate all possible steps and determine which is the most appropriate to begin with. There are various ways to manage units in this course. Your instructor can assist you with this, as they likely have a preferred method shaped by years of experience. It is crucial to select a technique and remain consistent with it. As you explore the different types of stress and strain, try to visualize what they look like. This will enhance your intuitive grasp of their associated formulas and will be beneficial as the semester progresses and you integrate all of these concepts together.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.46
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	HW	1	10% (0)	Continuous	
	Report	2	10% (0)	5,13	~~LO # 5, 8 and 10~~
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Equilibrium of Beams
Week 2	Equilibrium of Beams
Week 3	Equilibrium of Beams
Week 4	Bending stress in beams
Week 5	Bending stress in beams
Week 6	Bending stress in beams
Week 7	**Mid-term Exam**
Week 8	Shear stress in Beams
Week 9	Shear stress in Beams
Week 10	Beam Deflection
Week 11	Beam Deflection
Week 12	Beam Deflection
Week 13	Stress Transformation
Week 14	Stress Transformation
Week 15	Columns
Week 16	**A preparatory week before the Final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Philpot, Mechanics of Materials: An Integrated Learning System, 5e	No
Recommended Texts	Strength of Materials 4th Edition by Pytel and Singer	Yes
Websites		

Module Information معلومات المادة الدراسية		
Module Title	**Fluid Mechanics II**	**Module Delivery**
Module Type	**Core**	☐ **Theory**

Module Code	**ENV2403**	☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**
ECTS Credits	**5**	
SWL (hr/sem)	**125**	

Module Level	2	**Semester of Delivery**	2
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Dr. Udai Adnain Jahad	**e-mail**	eng.udai.jahad@uobabylon.edu.iq
Module Leader's Acad. Title	Asst. Prof.	**Module Leader's Qualification**	Ph.D.
Module Tutor	Dr. Udai Adnain Jahad	**e-mail**	eng.udai.jahad@uobabylon.edu.iq
Peer Reviewer Name	Dr. Udai Adnain Jahad	**e-mail**	eng.udai.jahad@uobabylon.edu.iq
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fluid Mechanics I	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. This Module focuses on establishing a strong foundation for students in the second grade of fluid mechanics 2. This Module provides a basic understanding of modified Bernoulli's equation and flow in pipes. **3.** This Module assists students in understanding how to apply these laws to other applications and explore related topics. 4. This Module provides an understanding of major and minor flow losses in circular and non-circular pipes. 5. This Module aims to an understanding of open channel flow, classifications of channels and classification of flow. 6. This Module provides the students with an understanding type of weirs, hydraulic jump, momentum equation and jet propulsion. 7. It also provides students with practical and scientific applications and how to interpret them from a scientific perspective. 8. This Module aims to link the theoretical material to the practical material and give students the opportunity to draw conclusions from what they have learned.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this module the student should be able to: 1. Demonstrate knowledge and understanding of the fundamentals of modified Bernoulli's equation and flow in pipes. Also, major and minor flow losses in circular and non-circular pipes. 2. Demonstrate a comprehensive understanding of scientific principles and methodology relating to open channel flow, classifications of channels and classification of flow. 3. Describe the performance and characteristics of weirs, hydraulic jump, momentum equation and jet propulsion.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Modified Bernoulli's equation. (2hr) 2. The flow in pipes (Reynold's number, laminar, transition, turbulent flow). (2hr) 3. Major flow losses in circular and non-circular pipes (Darcy- Weisbach equation). (4hr) 4. Minor flow losses in circular and non-circular pipes (types of minor losses). (4hr) 5. Open channel flow. (2hr) 6. Classifications of channels (regular section or irregular section, Natural or artificial channel, Prismatic or non-prismatic channels). (2hr) 7. Classification of flow (uniform flow, non-uniform flow, steady flow, unsteady flow, gradually varied flow, and rapidly varied flow). (2hr) 8. Design open channel (most economical cross-section, Chezy formula and Manning formula). (5hr) 9. Energy of flowing liquid in an open channel (Specific Energy and Critical Depths for Rectangular Channel, Specific Energy and Critical Depths for Non-Rectangular Channel). (6hr) 10. Classification of bed slopes of channels (critical slope, mild slope, steep slope, horizontal slope, adverse slope). (2hr) 11. Hydraulic jump (energy losses in hydraulic jump). (5hr) 12. The type of weirs (broad-crested and sharp-crested weirs). (5hr) 13. Momentum equation. (2hr) 14. Jet propulsion. (2hr)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategy is designed to provide students with the opportunity to demonstrate an understanding of scientific principles, methodologies, expand critical thinking skills, and mathematics methods, as well as the ability to describe particular systems and processes in the final examination. This will be achieved through lectures, tutorial classes, and coursework assignments that enable students to demonstrate their ability to interpret a problem and present a solution clearly and accurately.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	~~LO #1, 2, 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	Modified Bernoulli's equation
Week 2	The flow in pipes
Week 3	Major flow losses in circular and non-circular pipes
Week 4	Minor flow losses in circular and non-circular pipes
Week 5	Open channel flow
Week 6	Classifications of channels
Week 7	**Mid-term Exam**
Week 8	Classification of flow
Week 9	Design open channel
Week 10	Specific Energy
Week 11	Classification of bed slopes of channels
Week 12	Hydraulic jump
Week 13	The type of weirs
Week 14	Momentum equation
Week 15	Jet propulsion
Week 16	**A preparatory week before the Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Determination of Contraction Coefficient (*Cc*), Velocity Coefficient (*Cv*) and Discharge Coefficient (*Cd*) for flow through a Circular /Round Orifice **(2hr)**
Week 2	Lab 2: Determination of Flow Over Vee Notch or Weir **(2hr)**
Week 3	Lab 3: Determination of Flow Over Rectangular Notch or Weir **(2hr)**
Week 4	Lab 4: Determination of Flow Over Semicircle Notch or Weir **(2hr)**
Week 5	Lab 5: Friction Factor for Pipes of Different Sizes **(2hr)**
Week 6	Lab 6: Minor Loss in Pipe Fittings **(2hr)**
Week 7	Lab 7: Open Channel Flow- Sluice Gate **(2hr)**
Week 8	Lab 8: The Critical Depth **(2hr)**
Week 9	Lab 9: Hydraulic Jump **(2hr)**
Week 10	Lab 10: Calibration of Broad Crested Weir **(2hr)**
Week 11	Lab 11: To Verify theTime for The Level in A Rectangular Tank to Fall from Height H_1 to H_2 When the Flow Takes Through An Orifice **(2hr)**
Week 12	Lab 12: External Laminar Flows Over Immersed Bodies **(2hr)**
Week 13	Lab 13: To Study the Performance Characteristics of A Single Stage Centrifugal Pump **(2hr)**
Week 14	Lab 14: Prepare for the final exam **(2hr)**
Week 15	Lab 15: Final exam **(2hr)**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Vennard, J.K., 2011. ***Elementary fluid mechanics***. Read Books Ltd.	Yes
Recommended Texts	Pritchard, P.J. and Mitchell, J.W., 2016. *Fox and McDonald's* ***introduction to fluid mechanics***. John Wiley & Sons.	Yes
Websites	https://www.coursera.org/search?query=fluid%20mechanics&	

Module Information معلومات المادة الدراسية					
Module Title	**Environmental Protection II**		**Module Delivery**		
Module Type	**Core**		☐ **Theory**		
Module Code	**ENV2404**		☒ **Lecture**		
ECTS Credits	**5**		☐ **Lab**		
SWL (hr/sem)	**125**		☒ **Tutorial**		
			☐ **Practical**		
			☐ **Seminar**		
Module Level	2	**Semester of Delivery**		1	
Administering Department	Type Dept. Code	**College**	Type College Code		
Module Leader	Dr. Rawaa Hussein Kadhim Al-Isawi	**e-mail**	Eng.rawaa.alisawi@uobabylon.edu.iq		
Module Leader's Acad. Title	Asst. Professor	**Module Leader's Qualification**		Ph.D.	
Module Tutor	Dr. Rawaa Hussein Kadhim Al-Isawi	**e-mail**	Eng.rawaa.alisawi@uobabylon.edu.iq		
Peer Reviewer Name	Dr. Rawaa Hussein Kadhim Al-Isawi	**e-mail**	Eng.rawaa.alisawi@uobabylon.edu.iq		
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course focuses on the principles and practices of environmental protection, aiming to develop students' skills and cognitive understanding of sustainability, pollution control, conservation, and risk assessment. It emphasizes the use of clear and precise

	language to accurately communicate environmental issues, including toxicity, hazardous solid waste, and food contamination risk assessment. In addition to complementing other courses, this program aims to prepare specialized professionals in environmental engineering who can implement development strategies and practical plans to improve and protect the environment. This course provides a comprehensive understanding of environmental protection, focusing on pollution control, waste management, toxicity assessment, hazardous waste disposal, and food contamination risk analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Environmental protection is essential in modern society, as it directly impacts public health, sustainability, and the overall quality of life. It plays a crucial role in managing natural resources, reducing pollution, and ensuring clean air and water for future generations. Educating students in environmental protection is vital, as it enhances their understanding of ecological balance, the consequences of human activities on nature, and the risks associated with toxicity and contamination. This course equips students with the knowledge and skills to analyze environmental issues, implement sustainable solutions, and address challenges such as pollution control, waste management, and resource conservation. Students will gain both theoretical and practical knowledge, qualifying them to work in the fields of hazardous waste management, radioactive waste management, and assessing the impact of pollutants on the environment and human health, including toxicity and contamination risks. The student understands the fundamental concepts of environmental protection. Learn how to identify environmental problems and explore possible solutions. Enabling students to assess and manage environmental sustainability projects.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Visualization and Representation: Visualize and represent engineering systems and their behaviors using appropriate diagrams, schematics, and other graphical tools, facilitating effective communication of ideas and analysis. Critical Thinking: Analyze and evaluate engineering problems from multiple perspectives, considering the limitations and assumptions of engineering models and making informed decisions based on available data

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The teaching and learning strategies vary to include a mix of traditional and modern methods aimed at enhancing students' understanding and developing their skills. These include: 1. Lectures that cover the fundamental concepts of the subject being taught in the semester. Various educational tools are used to enhance students' understanding, such as traditional presentations and diagrams to clarify difficult concepts. 2. Engaging students in the learning process through group discussions, problem-solving, and reports submitted by the students on the subject. 3. Training students to apply concepts through assignments and exercises. 4. Continuous assessment of students, which includes short quizzes, in-class assignments, and homework.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	HW.	2	10% (10)	6,12	~~All~~
	Report	2	10% (10)	9,13	~~All~~
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Pollution, Prevention, Introduction, Source Reduction, Recycle/ Reuse, Treatment
Week 2	Ultimate Disposal, Man and Environmental Communicable Diseases
Week 3	Hazardous Waste Management, Introduction, Toxic Materials, Overall Effects of Pollution
Week 4	Waste Minimization, Waste Exchange, Recycling
Week 5	Treatment Technologies, Land Disposal
Week 6	Toxicology, introduction
Week 7	Health Risk Analysis
Week 8	Hazard Risk Assessment
Week 9	Insect and Rodent Control
Week 10	Disinfectants and Insecticides
Week 11	Food Sanitation
Week 12	Insecticidal Sanitation
Week 13	Causes of Contaminated Food
Week 14	Types of Food Contaminants
Week 15	Engineering applications

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• Air Pollution: V.P. Kudesia: Pragati Prakashan, Meerut, 2018 • Water Pollution: V.P. Kudesia: Praagi Prakashan, Meerut, 2018	Yes

	• Green Earth: A Textbook on Environmental Education. Dr. Bihari Singh Kr. Ramjee Pd. Singh Srijan Publishers Pvt. Ltd. New Delhi, 2022	
Recommended Texts	• Bailey and Ollis,2000: Biochemical Engineering Fundamental: McGraw-Hill Series in Water Resources and Environmental Engineering • Chanlett,1997: Environmental Protection: McGraw-Hill Series in Water Resources and Environmental Engineering.	No
Websites		

Module Information معلومات المادة الدراسية					
Module Title	**Chemistry**			**Module Delivery**	
Module Type	Support			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**ENV2406**				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level	2	**Semester of Delivery**		2	
Administering Department	Type Dept. Code	**College**	Type College Code		
Module Leader	Dr. Isra'a Sadi Abdul-Amir Samaka	**e-mail**	eng.israa.sadi@uobabylon.edu.iq		
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**		Ph.D.	
Module Tutor	Dr. Isra'a Sadi Abdul-Amir Samaka	**e-mail**	eng.israa.sadi@uobabylon.edu.iq		
Peer Reviewer Name	Dr. Isra'a Sadi Abdul-Amir Samaka	**e-mail**	eng.israa.sadi@uobabylon.edu.iq		
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop problem-solving skills and understanding of chemistry theory through applications. 2. This course covers the fundamental concepts of chemistry, making it a foundational subject for all environmental engineering courses that address environmental pollution. 3. This module aims to link the theoretical to the practical part and allow students to draw conclusions from what he has learned. 4. The student determines the importance and justification for studying chemistry. 5. The student learns the methods of expressing the concentrations of solutions to understand the methods of expressing the concentrations of pollutants to which the environment is exposed and to determine what is within acceptable limits and what is dangerous to them. 6. Knowing how to calculate the oxidation numbers of each element in compounds and determining what is stable and neutral among them. 7. Knowing how to calculate the equivalent weights of different compounds because the subject of equivalent weight is related to different vocabulary from this course. 8. Identifying different aspects involved in their normal and molarity calculations. 9. Dilution calculations for many solutions are also known. 10. Knowing the acid and base chemistry. 11. The student will identify the types of electrolytes and their ionizing behavior. 12. Identify how salts are formed, their types and the degree of their hydrolysis. 13. Knowing the student to buffer solutions, how they are obtained and prepared, and their role in controlling some reactions that require a certain pH to occur. 14. Knowing the solubility product to identify the solubility of sediments to determine the state of solutions when some substances are present in them in terms of equilibrium (saturation) or precipitation (oversaturation) or a state under saturation. 15. Identifying the titration and its importance, and how to calibrate many solutions. The primary and secondary standard materials for each type of titration are known.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. By the end of this module the student should be able to: 2. Demonstrate knowledge and understanding of the fundamentals of chemistry and its various applications in environmental engineering. 3. Understanding the basic concepts of chemistry and chemical analysis for 4. dealing with effective plans to protect and improve the environment 5. and the ability to develop solutions to environmental problems. 6. The student is introduced to the basic concepts of chemistry and chemical analysis, including the handling of chemicals and hazardous waste, with a focus on their impact on health and the environment, as well as how to safely manage them.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: 1. Basic chemistry (Definitions, basic concepts): Knowing the importance and justification for studying chemistry and knowing the basic terms and concepts used in chemistry. (2 hr) 2. Methods of expressing of composition of solutions: Knowing the methods of expressing the concentrations of solutions. (4 hr) 3. Oxidation number: Knowing how to calculate the oxidation numbers of each element in compounds. (2 hr) 4. Equivalent weights for compounds: Knowing how to calculate the equivalent weights of different compounds. (2 hr) 5. Computations based on normality and molarities: Identifying different aspects involved in their normality and molarity calculations ,as well as dilution calculations for various solutions, is also known. (2 hr)

	6. Acid-base chemistry: Knowing the acid and base chemistry. (4 hr) 7. Electrolytes: Identifying the types of electrolytes and their ionizing behavior. (2 hr) 8. Salts: Identify how salts are formed, their types and the degree of their hydrolysis. (2 hr) 9. Solubility: Knowing the solubility product to identify the solubility of sediments. (2 hr) 10. Buffer solutions: Knowing the student to buffer solutions, how they are obtained and prepared, and their role in controlling some reactions that require a certain pH to occur. (2 hr) 11. Titration and Standardization: Identifying the titration and its importance, as well as how to calibrate various solutions, including the titrations of acid-base reactions. Additionally, the primary and secondary standard materials for each type of titration are recognized. (4 hr)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The assessment strategy is designed to provide students with the opportunity to demonstrate an understanding of scientific principles, methodologies, expand their critical thinking skills, and apply mathematical methods, as well as the ability to describe particular systems and processes in the final examination. This will be achieved through classes, interactive tutorials and coursework elements that allow students to demonstrate that they can interpret a problem and present a solution clearly and accurately, as well as by considering the type of experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	~~LO #1, 2, 10 and 11~~
	Assignments	2	10% (10)	2, 12	~~LO # 3, 4, 6 and 7~~
	Projects / Lab.	1	10% (10)	Continuous	
	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	Basic chemistry (Definitions, basic concepts)
Week 2	Methods of expressing of composition of solutions
Week 3	Methods of expressing of composition of solutions
Week 4	Oxidation number
Week 5	Equivalent weights for compounds
Week 6	Computations based on normalities and molarities
Week 7	**Mid-term Exam**
Week 8	Acid-base chemistry
Week 9	Acid-base chemistry
Week 10	Electrolytes
Week 11	Salts
Week 12	Solubility
Week 13	Buffer solutions
Week 14	Titration and standardization
Week 15	Titration and standardization

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Preparation of (0.1 N, 0.1 M) of sodium carbonate standardization. **(2hr)**
Week 2	Lab 2: Preparation of (0.1 N) HCL solution and standardization with sodium carbonate. **(2hr)**
Week 3	Lab 3: Preparation of (0.1 N) (NaOH) solution and standardization of it with 0.1 N (HCl). **(2hr)**
Week 4	Lab 4: Preparation and standardization of 0.1N acetic Acid solution with 0.1 N (NaOH). **(2hr)**
Week 5	Lab 5: Determination acidity of vinegar. **(2hr)**
Week 6	Lab 6: Determination of hardness of water. **(2hr)**
Week 7	Lab 7: Preparation and standardization of 0.1N $AgNO_3$ solution by Mohr method and determination of chloridin soluble chloride. **(2hr)**
Week 8	Lab 7: Preparation and standardization of 0.1N $AgNO_3$ solution by Mohr method and determination of chloridin soluble chloride. **(2hr)**
Week 9	Lab 9: Determination chloride according to the modified Volhard method. **(2hr)**
Week 10	Lab 10: Preparation and standardization of (0.1N) $KMnO_4$. **(2hr)**
Week 11	Lab 11: Preparation and standardization of (0.1N) $KMnO_4$. **(2hr)**
Week 12	Lab 12: Determination the concentration of (Fe^{+2}) Ion in $FeSO_4(NH_4)$ $SO_4.2H_2O$. **(2hr)**
Week 13	Lab 13: Determination the concentration of (Fe^{+2}) Ion in $FeSO_4(NH_4)$ $SO_4.2H_2O$. **(2hr)**
Week 14	Prepare for the final exam. **(2hr)**
Week 15	Lab 15: Final exam **(2hr)**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	○ D., L., Ronald, John, 1997, "Theory and practice of water and wastewater treatment", Wiley and Sons Inc.	

	○ D., Harvey, 2000, "Modern analytical chemistry", McGraw-Hill Comp. ○ D., Kealey, 2000, "Principles and practice of analytical chemistry", Blackwell Science Ltd. ○ M., Al-Abayji, T. S., Al-Ghabsha. The Foundations of Analytical Chemistry. University of Mosul. ○ Awad, H., Al-Badri, J., Saeed, S., Al-Shallal, A. K., "Theoretical Fundamentals of Inorganic Analytical Chemistry", Ministry of Higher Education and Scientific Research, 1980.	
Recommended Texts		
Websites		

Module Information معلومات المادة الدراسية					
Module Title	**Building materials and construction**		**Module Delivery**		
Module Type	Support		☐ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**		
Module Code	**ENV2405**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr. Zaid Ali Hasan		**e-mail**	zaid.hasan.bib@atu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	**1/9/2024**		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The subject Building Materials aims to provide students with a comprehensive understanding of various building materials, their properties, characteristics, and applications in construction. Here are the common aims of a Building Materials module: Introduction to Building Materials: Introduce students to the fundamental concepts and principles of building materials, including their types, properties, and composition. This includes understanding the relationship between material properties and their behavior in different construction applications. Material Selection and Performance: Develop students' knowledge and skills to evaluate and select suitable building materials for specific construction projects. This involves considering factors such as durability, strength, thermal properties, fire resistance, sustainability, and cost-effectiveness. Material Testing and Characterization: Familiarize students with the techniques and methods used for testing and characterizing building materials. This includes understanding the principles of laboratory testing, interpreting test results, and evaluating material performance by relevant standards and specifications. Structural Behavior and Load-Bearing Capacity: Provide students with an understanding of the structural behavior of building materials under different loads and environmental conditions. This includes studying the stress-strain relationship and deformation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge of Building Materials: Demonstrate knowledge and understanding of different types of building materials, including their properties, composition, behavior, and applications in construction. Material Selection and Evaluation: Evaluate and select suitable building materials based on specific project requirements, taking into account factors such as structural performance, durability, sustainability, and cost-effectiveness. Material Testing and Analysis: Apply testing methods and techniques to characterize and analyze the properties of building materials, including strength, stiffness, thermal conductivity, moisture resistance, and fire resistance. Structural Behavior and Performance: Analyze and predict the structural behavior of building materials under different loading conditions, including their response to forces, deformation characteristics, and failure modes. Sustainability and Environmental Considerations: Recognize the importance of sustainable building practices and evaluate the environmental impact of building materials, taking into account factors such as embodied energy, life cycle assessment, and recycling. Construction Techniques and Applications: Apply knowledge of building materials to different construction techniques and systems, understanding their compatibility, installation methods, and considerations for specific types of structures.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures and Presentations: Conducting lectures and presentations to deliver theoretical knowledge and fundamental concepts related to building materials. This can include discussing material properties, characteristics, behavior, and applications. Case Studies and Examples: Presenting case studies and real-world examples to illustrate building materials' selection, evaluation, and application in construction projects. This helps students understand how materials are utilized in practical scenarios. Laboratory Sessions: Organizing laboratory sessions where students can perform experiments and tests on building materials. This provides hands-on experience in material testing, characterization, and analysis, reinforcing theoretical concepts and promoting critical thinking. Field Trips and Site Visits: Arrange field trips and site visits to construction sites or manufacturing facilities where students can observe and examine building materials in real-world applications. This enhances their understanding of material selection and performance. Group Discussions and Debates: Facilitating group discussions and debates on topics related to building materials. This encourages critical thinking, analysis, and collaborative learning as students share their perspectives, debate ideas, and work together to solve problems. Guest Lectures: Inviting guest speakers, such as industry professionals or material specialists, to share their expertise and experience related to building materials. This provides valuable insights and exposes students to real-world practices and innovations in the field.

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

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	~~LO # 5, 8 and 10~~
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Building Materials:
Week 2	Definition and classification of building materials
Week 3	Role of building materials in construction
Week 4	Factors influencing material selection
Week 5	Building Materials and Sustainability:
Week 6	Concrete and Cementitious Materials:
Week 7	Composition and hydration of cement
Week 8	Properties and behavior of concrete
Week 9	Concrete mix design and proportioning
Week 10	**Masonry Materials:**
Week 11	Timber and Wood-based Materials:
Week 12	Material Testing and Quality Control:
Week 13	Standard tests and procedures for evaluating material properties
Week 14	Non-destructive testing methods
Week 15	Quality control and inspection of building materials

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Brick Testing
Week 2	Dimensional Stability,
Week 3	Water Absorption Test:
Week 4	Water Absorption Test:
Week 5	Aggregate Testing:
Week 6	Fine Aggregate
Week 7	Course Aggregate
Week 8	Compressive Strength Test:
Week 9	Concrete Testing
Week 10	Compressive strength testing of concrete
Week 11	Non-destructive testing methods like ultrasonic pulse velocity and rebound hammer tests
Week 12	Wood Testing:
Week 13	Wood Testing:
Week 14	Non-Destructive Testing:
Week 15	Non-Destructive Testing:

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		No
Recommended Texts	Materials for Civil and Construction Engineers" by Michael S. Mamlouk and John P. Zaniewski (Publisher: Pearson) ASTM International (American Society for Testing and Materials) British Standards Institution (BSI)	Yes
Websites		

Module Information معلومات المادة الدراسية			
Module Title	**Computer II**	**Module Delivery**	
Module Type	Basic	☐ **Theory**	
Module Code	**UOBAB2004**	☒ **Lecture**	
ECTS Credits	**3**	☒ **Lab**	
SWL (hr/sem)	**75**	☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Level	2	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code

Module Leader	Dr. Hussein Hamid E. Al-Husseini	**e-mail**	hussein.emran@uobabylon.edu.iq
Module Leader's Acad. Title	lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Hussein Hamid E. Al-Husseini	**e-mail**	hussein.emran@uobabylon.edu.iq
Peer Reviewer Name	Name	**e-mail**	hussein.emran@uobabylon.edu.iq
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Teaching the student programming style in general 2. How to solve engineering problems in his specialty through scientific programs 3. Preparing the student for his future life by adopting the BASIC language in solving significant engineering problems (input information and engineering equations) that he faces at work. In the future, he can deal smoothly with ready-made engineering computer systems because he has a scientific background in how programs work.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognizing Hardware and Software Concepts 2. Summarize what is meant by Applications of Information Electronics and Communication Technology (IECT) 3. Discuss Computer Portions 4. Define types of operating systems 5. Discuss Word Processing Basics 6. Define the Basics of Spreadsheets 7. Describe Introduction to Presentation Software 8. Recognize Computer Networks Basics
Indicative Contents المحتويات الإرشادية	1. Introduction to computers, concept of data and information, applications of information electronics. 2. Computer components, including the concepts of hardware and software, along with their respective components. 3. Operating system, the basis of the common operating system, and the user interface. 4. Basics of word & spreadsheet, manipulation of cells. 5. Introduction to the Internet and Web Browsers, Computer Networks, Basic Concept of the Internet and Its Applications, Connecting to the Internet.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary strategy to be adopted in delivering this unit is to encourage students' participation in theoretical lectures and practical programmes while at the same time improving and expanding their thinking skills. This will be accomplished through classroom and interactive engineering applications, as well as by considering the type of engineering programs that incorporate multiple environmental issues.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	3,5, 12	~~LO #1, 2, 10 and 11~~
	Assignments	5	10% (10)	2, 4,9,12,15	~~LO # 3, 4, 6 and 7~~
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	~~LO # 5, 8 and 10~~
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	~~LO # 1-7~~
	Final Exam	3hr	50% (50)	16	~~All~~
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Security and Networking
Week 2	Security and Networking
Week 3	E-Commerce
Week 4	E-Commerce
Week 5	Computer Troubleshooting
Week 6	Computer Troubleshooting
Week 7	Introduction to AI
Week 8	Introduction to AI
Week 9	Al in Our Daily Lives
Week 10	Applications of AI
Week 11	Applications of AI
Week 12	AI and Society
Week 13	AI and Society
Week 14	Ethical Challenges in AI
Week 15	The Future of AI

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Security and Networking
Week 2	Security and Networking
Week 3	E-Commerce
Week 4	E-Commerce
Week 5	Computer Troubleshooting
Week 6	Computer Troubleshooting
Week 7	Introduction to AI
Week 8	Introduction to AI
Week 9	Al in Our Daily Lives
Week 10	Applications of AI
Week 11	Applications of AI
Week 12	AI and Society
Week 13	AI and Society
Week 14	Ethical Challenges in AI
Week 15	The Future of AI

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	-	-
Recommended Texts	Technology in action complete, Alan Evans, 16th ed. (2020)	No
Websites		

Module Information معلومات المادة الدراسية					
Module Title	**English Language II**		**Module Delivery**		
Module Type	Basic		☒ **Theory**		
Module Code	**UOBAB2302**		☐ **Lecture**		
ECTS Credits	2		☐ **Lab**		
SWL (hr/sem)	50		☐ **Tutorial**		
			☐ **Practical**		
			☐ **Seminar**		
Module Level	2	**Semester of Delivery**		2	
Administering Department	Type Dept. Code	**College**	Type College Code		
Module Leader	Dr. Wathiq Al-Jabban	**e-mail**	eng.israa.sadi@uobabylon.edu.iq		
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**		Ph.D.	
Module Tutor	Dr. Wathiq Al-Jabban	**e-mail**	eng.israa.sadi@uobabylon.edu.iq		
Peer Reviewer Name	Dr. Wathiq Al-Jabban	**e-mail**	eng.israa.sadi@uobabylon.edu.iq		
Scientific Committee Approval Date	**1/9/2024**	**Version Number**	1.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Learning English can enhance one's communication skills, facilitating effective interaction with people worldwide. English speakers have a better chance of finding jobs and obtaining more opportunities in their respective fields. Being proficient in the language also helps to gain a better understanding of different cultures. Additionally, when one is familiar with English, it becomes easy to access vast amounts of knowledge existing online. 2. English can also be used as a tool for developing better cognitive skills. This is achieved by reading other published works, expanding one's vocabulary, or listening to conversations and lectures. Being able to use the language fluently also opens up opportunities to access information, which helps to broaden one's perspective on different topics. Additionally, interpreting texts and articles written in English enhances one's cognitive skills as well as one's ability to form logical conclusions. 3. Learning English can help to increase self-confidence. Speaking English effectively plays a crucial role in navigating challenging situations. When one is fluent in the language, he/she can easily express his/her thoughts and suggestions to an audience or in formal settings. As a result, it will improve the ability to deliver powerful speeches in formal situations. Furthermore, learning English increases one's self-esteem and confidence in being a global citizen. Also, when one can understand English, he/she can better comprehend different kinds of political and social issues, helping them to become a more educated global individual. To understand voltage, current and power from a given circuit.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Unit One of English language learning is all about how to say hello and introducing oneself. Being able to use basic greeting phrases is a fundamental part of any language, so it's important to start with mastering it. Along with learning to say hello, there are important grammar points that need to be considered, as well as topic-specific vocabulary and key everyday English skills. Furthermore, specific topics such as work English and how to talk about what you do for a job can be introduced and explored. 2. In order to gain a full understanding of Unit Two, it is important to understand the different concepts included within it. This includes learning new words and grammar, developing your skills in practice exercises, and getting more comfortable and confident with using English in everyday contexts. 3. Unit Three of English language teaching focuses on helping students understand the basics of the language and how it functions in everyday communication. This unit focuses on grammar, vocabulary, skills work and Everyday English. 4. In Unit Four of our language class, we dive into the concepts of family and friends, exploring various aspects of grammar, vocabulary, and related skills work and everyday English. Broadly speaking, family and friends is an important part of human life, and so it's natural to explore how to talk about them in a second language.

	5. Unit Five: The Way I Live has been a great learning experience for me since it involved the study of grammar, vocabulary, skills work and everyday English. Grammar was focused on developing my understanding of sentence structure and how to understand verb tenses and other similar components. Additionally, learning new vocabulary broadened my knowledge base and enabled me to use more expressive phrases. Lastly, Skills Work and Everyday English helped me enhance my everyday communication, allowing me to better express myself and understand others more effectively. 6. Unit Six of the English course was immensely helpful in furthering my understanding of the language. In this unit, I focused on grammar and vocabulary and also practiced my skills in work-related and everyday English. Specifically, I made sure to pay attention to the difficult rules behind grammar, as well as new words I needed to learn. I also worked on improving my communication skills by practicing speaking and writing in English. Last but not least, I focused on using appropriate everyday language to make sure I can apply my English skills in real-life settings. 7. Unit Seven has quickly become the favorite unit in the English language. In this unit, we focus on honing our grammar, expanding our vocabulary, sharpening our skills, and enriching our everyday English
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. To help English learners become more proficient in the language. It offers a variety of tips and strategies designed to enhance a learner's understanding of English, as well as their reading, writing, and speaking abilities. Relevant activities, techniques and articles can be found on the blog, helping English learners build their confidence in their language skills. [15 hrs] Additionally, it offers interactive activities, including grammar quizzes, English language games, and writing and conversation challenges. These activities provide learners with the opportunity to practice their English in a practical and enjoyable way. They also provide learners with the opportunity to compare their knowledge with other English learners. [10 hrs] Additionally, it provides videos, podcasts, and audio recordings. The videos are specifically designed for English learning, featuring conversations, discussions, and stories. The podcasts and audio recordings feature English conversations that cover a range of topics, providing learners with valuable English listening practice. [5 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Learning English can be a difficult task; however, with the right approach and strategies, it can become much more manageable. Dedicating yourself to developing English skills is key to attaining fluency and successful communication. Here are some simple yet effective strategies for developing English proficiency: 1. Read Regularly: Developing good reading skills is essential for language acquisition. Reading widely, from newspapers to novels, can help you learn more about the language and increase your vocabulary. Reading in English can help you learn grammar and sentence structure more quickly. 2. Listen Actively: Listening actively means not only understanding what is being said but also comprehending the inferences and subtleties behind the language. Developing your listening skills can help you become more confident when speaking English. 3. Use Technology: Technology can be a powerful tool, helping you to practice both listening and pronunciation. Watch movies, TV shows, and listen to podcasts in English to improve your comprehension. You can also practice pronouncing different words with the help of free websites and apps. 4. Speak Mindfully: When trying to converse in a foreign language, it can be challenging to create the right phrases and words to express yourself. To practice speaking English confidently, remember to focus on specific topics that interest you and on which you have good knowledge. This will help you to talk properly and accurately. 5. Immerse Yourself: Surrounding yourself with English, whether in conversations or a native-English-speaking community, provides exposure to the language and makes it easier to use. Learning English doesn't have to be a solo experience; practicing with others helps maintain motivation as you deepen your language skills.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
As		**Time/Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	~~LO #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	New Headway Pre Intermediate: Intermediate, Unit 8
Week 2	New Headway Pre Intermediate: Intermediate, Unit 8
Week 3	New Headway Pre Intermediate: Intermediate, Unit 9
Week 4	New Headway Pre Intermediate: Intermediate, Unit 9
Week 5	New Headway Pre Intermediate: Intermediate, Unit 10
Week 6	New Headway Pre Intermediate: Intermediate, Unit 10
Week 7	New Headway Pre Intermediate: Intermediate, Unit 10
Week 8	New Headway Pre Intermediate: Intermediate, Unit 11
Week 9	New Headway Pre Intermediate: Intermediate, Unit 11
Week 10	New Headway Pre Intermediate: Intermediate, Unit 12
Week 11	New Headway Pre Intermediate: Intermediate, Unit 12
Week 12	New Headway Pre Intermediate: Intermediate, Unit 13
Week 13	New Headway Pre Intermediate: Intermediate, Unit 13
Week 14	New Headway Pre Intermediate: Intermediate, Unit 14

Week 15	New Headway Pre Intermediate: Intermediate, Unit 14

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	New Headway Plus Beginner / Oxford University Syllabus	No
Recommended Texts		No
Websites		