نموذج وصف البرنامج الأكاديمي

اسم الجامعة: جامعة تكريت

الكلية/ المعهد: كلية الهندسة

القسم العلمي: قسم هندسة السدود والموارد المائية

اسم البرنامج الأكاديمي او المهني: بكالوريوس هندسة السدود والموارد المائية

اسم الشهادة النهائية: بكالوريوس هندسة السدود والموارد المائية

النظام الدراسي: مسار بولونيا

تاريخ اعداد الوصف: 2025

تاريخ ملء الملف: 2025

التوقيع:

اسم رئيس القسم: ا.م.د. حسام عبد الله دحام

التاريخ: ٢٠٢٥/٩/٣٠

التوقيع:

اسم المعاون العلمي: ا.د. سعد محمود رؤوف

التاريخ: ٢٠٢٥/٩/٣٠

وزارة التعليم العالي والبحث العلمي
جامعة تكريت / كلية الهندسة
شعبة ضمان الجودة والتقييم الاداء

دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

اسم مدير شعبة ضمان الجودة والأداء الجامعي: م.د. احمد ياسر رديف

التاريخ ٢٠٢٥/٩/٣٠

التوقيع

٢٠٢٥/١٠/١

مصادقة السيد العميد

الاستاذ المساعد الدكتور

سعد رمضان احمد

عميد كلية الهندسة

Academic Program Description Form

University Name: Tikrit University

Faculty/Institute: College of Engineering

Scientific Department: Dams and Water Resources Engineering

Academic or Professional Program Name: Bachelor's Program in Dams and Water Resources Engineering

Final Certificate Name: Bachelor's Degree in Dams and Water Resources Engineering

Academic System: Bologna Process

Description Preparation Date: 2025

File Completion Date: 2025

Signature:

Head of Department Name:

Asst. Prof. Hosam A. Daham

Date: 30/9/2025

Signature:

Scientific Associate Name:

Prof. Saad M. Raof

Date: 30/09/2025

The file has been checked by: Ahmed Y. Radeef

Quality Assurance and University Performance Department

Director of the Quality Assurance and University Performance Department:

Date: 30/9/2025

Signature:

S. R. Ahmed

Dean's Approval

Asst. Prof. Saad R. Ahmed

Ministry of Higher Education and Scientific Research
Scientific Supervision and Scientific Evaluation Apparatus
Directorate of Quality Assurance and Academic Accreditation
Department

Academic Program and Course Description Guide

Dams and Water Resources Department

2026

Introduction:

The educational program is a well—planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staP together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quaJerly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: **A** compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra— curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: Tikrit University

Faculty/Institute: College of Engineering

Scientific Department: Dams and Water Resources Engineering

Academic or Professional Program Name: Bachelor's Program in Dams and Water Resources Engineering

Final Certificate Name: Bachelor's Degree in Dams and Water Resources Engineering

Academic System: Bologna Process

Description Preparation Date: 2025

File Completion Date: 2025

Signature:	**Signature:**
Head of Department Name:	**Scientific Associate Name:**
Asst. Prof. Hosam A. Daham	**Prof. Saad M. Raof**
Date:	**Date:**

The file has been checked by:

Quality Assurance and University Performance Department

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

Dean's Approval

Asst. Prof. Saad R. Ahmed

1. Program Vision

Leadership in preparing specialized engineers in Dams and Water Resources Engineering who possess high scientific and professional competence and are able to address water-related challenges and achieve sustainable development at the local and regional levels.

2. Program Mission

Preparing scientifically and practically qualified engineering cadres in the field of designing, implementing, and managing dams and water resources projects through a distinguished educational and research environment that keeps pace with scientific developments and serves the community.

3. Program Objectives

- Graduate engineers with a solid scientific foundation in basic engineering sciences.
- Enable students to analyze and design dams and hydraulic structures.
- Develop skills for efficient and sustainable water resources management.
- Enhance students' research and innovation capabilities.
- Serve the community by providing engineering solutions to water-related problems.
- Consolidate the concepts of sustainability and environmental protection.

4. Program Accreditation

There is currently no program accreditation. The department is working to complete the requirements for obtaining program accreditation in accordance with the standards of the Ministry of Higher Education and Scientific Research.

5. Other External Influences

- Requirements of the Ministry of Higher Education and Scientific Research.
- Needs of the local labor market.
- National plans for water resources management.
- Global technological developments in the field of dams.

6. Program Structure

Program Structure	Number of Courses	Credit Units	Percentage	Notes*
Institution Requirements	7	18	7%	Basic
College Requirements	8	30	12%	Basic
Department Requirements	32	162	67%	Basic
Summer Training	1	4	2%	Compulsory
Other	5	26	12%	Compulsory / Optional

* Notes may include whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Units	SWL (hr/sem)
First	MATH-101	Calculus I	6	150
First	ENG-101	Engineering Mechanics I	5	125
First	UOT-003	Computer I	3	75
First	ENG-102	Engineering Drawing	6	150
First	DWRE-101	Introduction to Water Resources Engineering	6	100
First	UOT-004	Human Rights and Democracy	2	50
First	UOT-001	Arabic Language I	2	50
First	MATH-102	Calculus II	6	150
First	ENG-103	Engineering mechanics II	5	125
First	UOT-031	Computer II	3	75
First	DWRE-102	Construction materials	4	100
First	DWRE-104	Analytical Chemistry	5	125
First	DWRE-103	Engineering Statistics	5	125
First	UOT 002	English Language I	2	50
Second	MATH-201	Calculus III	6	150
Second	DWRE-201	Strength of Materials	4	100
Second	DWRE-202	Fluid Mechanics 1	6	150
Second	DWRE-203	Engineering Surveying I	6	150
Second	DWRE-204	Concrete Technology	4	100
Second	UOT005	The Crimes of the Baath Regime in Iraq	2	50
Second	UOT-011	Arabic Language II	2	50
Second	MATH -202	Calculus IV	6	150
Second	DWRE-205	Fluid Mechanics II	6	150

Second	DWRE-206	Engineering Surveying II	6	150
Second	DWRE-207	Water Quality and Pollution	5	125
Second	DWRE-208	ENGINEERING GEOLOGY		75
Second	UOT-011	Ethics and Leader Skills	2	50
Second	UOT-021	English Language II	2	50
Third	MATH-301	Engineering Analysis	4	100
Third	DWRE-301	Structural Analysis	5	125
Third	DWRE-302	Soil Mechanics I	5	125
Third	DWRE-303	Engineering Hydrology I	6	150
Third	DWRE-304	Open Channels Hydraulics	6	150
Third	DWRE-305	Engineering Economy and Management	4	100
Third	MATH-302	Numerical Analysis	4	100
Third	DWRE-306	Concrete Design	5	125
Third	DWRE-307	Soil Mechanics II	5	125
Third	DWRE--308	Engineering Hydrology II	6	150
Third	DWRE-309	Irrigation Engineering and Practices	5	125
Third	DWRE-310	Hydraulics of pipeline systems	5	125
Fourth	DWRE-401	Hydraulic Structures I	6	150
Fourth	DWRE-402	Foundations Engineering	5	125
Fourth	DWRE-403	Methods of Construction and Estimation	4	100
Fourth	DWRE-404	Drainage Engineering and Practices	4	100
Fourth	DWRE-405	Graduation Project I	6	150
Fourth	DWRE-406	Hydraulic Structures II	6	150
Fourth	DWRE-407	Rivers Engineering	5	125
Fourth	DWRE-408	Dams and Reservoirs Engineering	5	125
Fourth	DWRE-409	Sanitary Engineering	4	100
Fourth	DWRE-410	Graduation Project II	6	150

8. Expected Learning Outcomes of the Program

Knowledge	A1: Understand the basic principles of mathematics, physics, and engineering. A2: Interpret hydrological and hydraulic processes. A3: Identify types of dams and their designs. A4: Understand irrigation and drainage systems and water resources management.
Skills	B1: Analyze complex engineering problems and propose appropriate solutions. B2: Perform hydraulic and hydrological calculations. B3: Use specialized engineering software. B4: Design dams and water structures.
Ethics	C1: Commit to professional ethics. C2: Work within an engineering team. C3: Comply with occupational safety standards. C4: Adopt principles of environmental sustainability.

9. Teaching and Learning Strategies

The program adopts theoretical lectures, practical laboratories, field training, applied projects, discussion seminars, supportive e-learning, and real case studies.

10. Evaluation Methods

Daily quizzes, semester exams, final exams, practical reports, individual and group projects, summer training evaluation, and graduation project discussion.

11. Faculty

Academic Rank	General Specialization	Specific Specialization	Special Requirements/Skills (if any)	Staff	Lecturer
Professor	Building and Construction Engineering	Water Resources		1	
Professor	Civil Engineering	Water Resources		1	
Professor	Civil Engineering	Water Treatment		1	
Professor	Civil Engineering	Structures		1	
Professor	Civil Engineering	Construction Project	**6**	1	

		Management			
Professor	Architecture	Urban Planning and Design		1	
Assistant Professor	Civil Engineering	Water Resources		3	
Assistant Professor	Civil Engineering	Geotechnics		1	
Assistant Professor	Civil Engineering	Structures		2	
Lecturer	Civil Engineering	Water Resources		3	
Lecturer	Civil Engineering	Structures		3	
Lecturer	Civil Engineering	Geotechnics		2	
Assistant Lecturer	Civil Engineering	Water Resources		4	
Assistant Lecturer	Civil Engineering	Geotechnics		2	
Assistant Lecturer	Civil Engineering	Structures		4	
Assistant Lecturer	Civil Engineering	Project Management		2	
Assistant Lecturer	Civil Engineering	Roads		1	
Assistant Lecturer	Civil Engineering	Environment		1	
Assistant Lecturer	Management and Economics	Business Administration		1	
Assistant Lecturer	Electrical Engineering	Electrical Engineering		1	

Professional Development

Mentoring New Faculty Members

Mentoring New Faculty Members

This academic program at the College of Engineering, Tikrit University, is designed to enhance the knowledge and skills of new faculty members in different educational fields. The program begins by equipping faculty members with the core capacities needed to manage their duties efficiently, and then progresses to include the processes and procedures required to ensure the successful achievement of targeted learning outcomes in the academic programs.

Main components include educational and training courses on teaching methods, recent trends in university education, student assessment, test preparation, university policies and regulations, e-learning platforms, continuous evaluation, and professional development opportunities offered by the department and the Continuing Education Unit at the College of Engineering.

Professional Development of Faculty Members

Professional Development of Faculty Members

The faculty of the Department of Dams and Water Resources Engineering at the College of Engineering, Tikrit University, maintains close cooperation with the Ministry of Higher Education and Scientific Research and the Ministry of Water Resources. This cooperation has contributed to organizing scientific seminars in the department, particularly on water scarcity challenges in Tikrit, Salah Al-Din Governorate, and Iraq in general.

The department's Continuing Education Committee develops faculty skills through lectures and workshops in areas such as electronic teaching and learning methods, scientific publications, academic accreditation, seminars in dams and water resources engineering, and participation in conferences, seminars, workshops, and training courses inside Iraq.

12. Acceptance Criteria

The admission capacity of the Department of Dams and Water Resources Engineering at the College of Engineering, Tikrit University, is determined within the annual admission plan according to the available departmental resources. The scientific committee determines the number of new students to be admitted, and the plan is submitted to the college deanship, the university presidency, and then to the Ministry of Higher Education and Scientific Research for official approval.

Admission to the undergraduate program is supervised by the Ministry of Higher Education and Scientific Research through the central admission system. Applicants must meet the following main requirements: Iraqi nationality; an Iraqi preparatory school certificate in the scientific/applied branch, or an officially recognized equivalent certificate; a medical fitness certificate; full-time attendance; not being enrolled in two colleges or institutes simultaneously; and acceptance of non-Iraqi students according to the seats and regulations assigned to them through central admission.

13. The Most Important Sources of Information about the Program

University guide.

Department website: https://ceng.tu.edu.iq/index.php/ar/alshwwn-alakadymyt/alaqsam-al-lmyt/qsm-hndst-alsdwd-walmward-almayyt

14. Program Development Plan

Adoption of the Bologna Process
The Council of the Department of Dams and Water Resources Engineering at the College of Engineering, Tikrit University, decided to adopt the Bologna Process to enhance the quality of education, improve the level of graduates, and meet the competencies and skills required by the labor market.

This transition includes implementing the European Credit Transfer and Accumulation System (ECTS) instead of the previous academic system, with a commitment to continuous improvement and development of the educational process. The system is planned to be officially implemented starting from the academic year 2025-2026.

Expected benefits include student-centered learning, increased classroom interaction, emphasis on professional and practical skills, continuous learning opportunities with feedback, semiannual assessment, and deeper knowledge-based understanding of academic subjects.

Program Skills Outline

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

Year/Level	Course Code	Course Name	Basic or Optional	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
First	MATH-101	Calculus I	Basic	*	*			*	*						
First	ENG-101	Engineering Mechanics I	Basic	*	*			*		*					
First	UOT-003	Computer I	Basic	*	*				*		*				
First	ENG-102	Engineering Drawing	Basic	*	*				*	*					
First	DWRE-101	Introduction to Water Resources Engineering	Basic	*		*	*	*						*	*
First	UOT-004	Human Rights and Democracy	Basic				*				*	*	*	*	*
First	UOT-001	Arabic Language I	Basic				*				*	*		*	
First	MATH-102	Calculus II	Basic	*	*			*	*						
First	ENG-103	Engineering Mechanics II	Basic	*	*			*		*					
First	UOT-031	Computer II	Basic	*	*				*		*				
First	DWRE-102	Construction Materials	Basic	*	*	*			*	*					*
First	DWRE-104	Analytical Chemistry	Basic	*	*			*	*						*
First	DWRE-103	Engineering Statistics	Basic	*	*			*	*	*					
First	UOT 002	English Language I	Basic				*				*		*	*	
Second	MATH-201	Calculus III	Basic	*	*			*	*						
Second	DWRE-201	Strength of Materials	Basic	*	*	*		*		*					*
Second	DWRE-202	Fluid Mechanics I	Basic	*	*	*		*	*	*					*
Second	DWRE-203	Engineering Surveying I	Basic	*	*	*		*	*	*			*		
Second	DWRE-204	Concrete Technology	Basic	*	*	*			*	*					*
Second	UOT005	The Crimes of the Baath Regime in Iraq	Basic				*				*	*		*	*
Second	UOT-011	Arabic Language II / Ethics and Leadership Skills	Basic				*				*	*		*	
Second	MATH -202	Calculus IV	Basic	*	*			*	*						
Second	DWRE-205	Fluid Mechanics II	Basic	*	*	*		*	*	*					*
Second	DWRE-206	Engineering Surveying II	Basic	*	*	*		*	*	*			*		
Second	DWRE-207	Water Quality and Pollution	Basic		*	*	*	*	*					*	*
Second	DWRE-208	Engineering Geology	Basic	*	*	*		*	*						*
Second	UOT-011	Arabic Language II / Ethics and Leadership Skills	Basic				*				*	*	*	*	*
Second	UOT-021	English Language II	Basic				*				*		*	*	
Third	MATH-301	Engineering Analysis	Basic	*	*			*	*						
Third	DWRE-301	Structural Analysis	Basic	*	*	*		*		*					*
Third	DWRE-302	Soil Mechanics I	Basic	*	*	*		*	*	*					*
Third	DWRE-303	Engineering Hydrology I	Basic	*	*	*		*	*	*				*	*
Third	DWRE-304	Open Channels Hydraulics	Basic	*	*	*		*	*	*					*
Third	DWRE-305	Engineering Economy and Management	Basic			*	*	*			*	*	*	*	
Third	MATH-302	Numerical Analysis	Basic	*	*			*	*	*					
Third	DWRE-306	Concrete Design	Basic	*	*	*		*		*					*
Third	DWRE-307	Soil Mechanics II	Basic	*	*	*		*	*	*					*
Third	DWRE--308	Engineering Hydrology II	Basic	*	*	*		*	*	*				*	*
Third	DWRE-309	Irrigation Engineering and Practices	Basic	*	*	*		*	*	*				*	*
Third	DWRE-310	Hydraulics of Pipeline Systems	Basic	*	*	*		*	*	*					*
Fourth	DWRE-401	Hydraulic Structures I	Basic	*	*	*		*		*				*	*
	DWRE-402	Foundations Engineering	Basic	*	*	*		*		*					*
	DWRE-403	Methods of Construction and Estimation	Basic		*	*	*	*		*	*	*	*		
	DWRE-404	Drainage Engineering and Practices	Basic	*	*	*		*	*	*				*	*
	-	Elective Course I	Optional												
	DWRE-405	Graduation Project I	Basic			*	*	*	*	*	*	*	*	*	*
	DWRE-406	Hydraulic Structures II	Basic	*	*	*		*		*				*	*
	DWRE-407	Rivers Engineering	Basic	*	*	*		*	*	*				*	*
	DWRE-408	Dams and Reservoirs Engineering	Basic	*	*	*		*		*				*	*

Year/Level	Course Code	Course Name	Basic or Optional												
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
	DWRE-409	Sanitary Engineering	Basic	*	*	*	*	*	*	*				*	*
	-	Elective Course II	Optional												
	DWRE-410	Graduation Project II	Basic			*	*	*	*	*	*	*	*	*	*

Course Description Form

1. Course Name:	Calculus I
2. Course Code:	MATH-101
3. Semester / Academic Year:	First / 2025-2026
4. Date of Preparation of this Description:	01/11/2025
5. Available Attendance Forms:	Theoretical lectures and tutorials
6. Total Study Hours / Total Units:	4 hours weekly / 6 units
7. Course Coordinator Name (if more than one name is mentioned):	Firas Hazem Jasim Mohammed
8. Course Objectives	An Overview of the derivatives, Integration, Indefinite integral, Integration by substitution, The definite integral, Evaluating definite integrals by substitution, Applications of the definite integral, Area between two curves, Volumes by slicing; disks and washers, Volumes by cylindrical shells, Length of a plane curve, and Area of a surface of revolution.
9. Teaching and Learning Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	4	Understand the topic and apply its concepts in solving exercises and practical problems.	An Overview of the derivatives.	Lecture and exercises	Class questions and assignments
Second	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Integration.	Lecture and exercises	Class questions and assignments
Third	4	Assess students' understanding of the previous topics.	Indefinite integral + (quiz 1)	Lecture and exercises	Quiz
Fourth	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Integration by substitution + The definite integral.	Lecture and exercises	Class questions and assignments
Fifth	4	Assess students' understanding of the previous topics.	Monthly Exam 1	Lecture and exercises	Monthly / midterm exam
Sixth	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Evaluating definite integrals by substitution	Lecture and exercises	Class questions and assignments
Seventh	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Applications of the definite integral.	Lecture and exercises	Class questions and assignments
Eighth	4	Assess students' understanding of the previous topics.	Area between two curves + (quiz 2)	Lecture and exercises	Quiz
Ninth	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Volumes by slicing; disks and washers.	Lecture and exercises	Class questions and assignments
Tenth	4	Assess students' understanding of the previous topics.	Volumes by cylindrical shells + (quiz 3)	Lecture and exercises	Quiz

Eleventh	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Length of a plane curve + Area of a surface of revolution.	Lecture and exercises	Class questions and assignments
Twelfth	4	Assess students' understanding of the previous topics.	Monthly Exam 2	Lecture and exercises	Monthly / midterm exam
Thirteenth	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Graph of Hyperbolic Functions .	Lecture and exercises	Class questions and assignments
Fourteenth	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Derivatives and Integrals of Hyperbolic Functions.	Lecture and exercises	Class questions and assignments
Fifteenth	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Hopital's Rule.	Lecture and exercises	Class questions and assignments
Sixteenth	4	Assess students' understanding of the previous topics.	Preparatory week before the final Exam	Lecture and exercises	Class questions and assignments

11. Course Evaluation

Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, relevant learning outcome LO #1, 2, 10 and 11.
Assignments: Formative assessment, time/number 2, weight 10% (10), week due 2, 12, relevant learning outcome LO # 3, 4, 6 and 7.
Projects / Lab.: Formative assessment, time/number 1, weight 10% (10), week due Continuous, relevant learning outcome All.
Report: Formative assessment, time/number 0, weight 0% (0).
Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1-7.
Final Exam: Summative assessment, time/number 3hr, weight 60% (60), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required prescribed textbooks (methodological, if any)	Calculus I By: Thomas
Main references (sources)	Calculus I By: Thomas
Recommended supporting books and references (scientific journals, reports, etc.)	Calculus I By: Thomas 2018
Electronic references and websites	https://tutorial.math.lamar.edu/?utm_source=chatgpt.com https://openstax.org/details/books/calculus-volume-1?utm_source=chatgpt.com

Course Description Form

1. Course Name:	Engineering Mechanics I
2. Course Code:	ENG-101
3. Semester / Academic Year:	First / 2025-2026
4. Date of Preparation of this Description:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures and tutorials
6. Total Study Hours / Total Units:	3 hours weekly / 5 units
7. Course Coordinator Name (if more than one name is mentioned):	Saad Mawlood Saab Hassan Al-Nasiri
8. Course Objectives	To develop problem solving skills and understanding of engineering mechanics (static) throughout the context of this course. To understand the principles of engineering mechanics I like vector and non-vector quantities, units conversion. This course also deals with force systems and their result. To understand the basics of equilibrium of objects. To understand force distribution in trusses and frames. To perform force analysis using the joint method and the section method.
9. Teaching and Learning Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and homework assignments.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Principles of statics, 1- basic concepts, 2- vector and non-vector quantities, 3- Units and their conversion	Lecture and exercises	Class questions and assignments
Second	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Force systems and their result. 1-Force system, 2- Analysis,	Lecture and exercises	Class questions and assignments
Third	3	Understand the topic and apply its concepts in solving exercises and practical problems.	3- Result of the converging forces, 4- Moment force,	Lecture and exercises	Class questions and assignments
Fourth	3	Assess students' understanding of the previous topics.	5- Doubles, Problem solving + Quiz 1	Lecture and exercises	Quiz
Fifth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	6- The result of non-converging forces	Lecture and exercises	Class questions and assignments
Sixth	3	Assess students' understanding of the previous topics.	Equilibrium. 1-concept of Equilibrium, 2- free body diagram, 3- Balance of parallel forces + Quiz 2	Lecture and exercises	Quiz
Seventh	3	Understand the topic and apply its concepts in solving exercises and practical problems.	4 - Equilibrium of bodies on which non-converging forces are applied	Lecture and exercises	Class questions and assignments
Eighth	3	Assess students' understanding of the previous topics.	Mid-term Exam + introduction about Trusses and Frames	Lecture and exercises	Monthly / midterm exam
Ninth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Trusses and Frames. 1-Trusses: A- Joints method part 1	Lecture and exercises	Class questions and assignments
Tenth	3	Assess students' understanding of the previous topics.	1-Trusses: A- Joints method part 2 + Quiz 3	Lecture and exercises	Quiz
Eleventh	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Trusses: B – Section method part 1	Lecture and exercises	Class questions and assignments
Twelfth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Trusses: B – Section method part 2 + Problem solving	Lecture and exercises	Class questions and assignments

Thirteenth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	2-Frames part 1	Lecture and exercises	Class questions and assignments
Fourteenth	3	Assess students' understanding of the previous topics.	2-Frames part 2 + Quiz 4	Lecture and exercises	Quiz
Fifteenth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Problem solving	Lecture and exercises	Class questions and assignments
Sixteenth	3	Assess students' understanding of the previous topics.	Preparatory week before the final Exam – review or open session for general questions	Lecture and exercises	Class questions and assignments

11. Course Evaluation

Quizzes (Q): Formative assessment, time/number 4, weight 20% (20), week due 4, 6, 11, 14, relevant learning outcome LO #Q1: 1-2, Q2: 5-6, Q3: 7-9, Q4: 10-13.
Assignments (A): Formative assessment, time/number 4, weight 20% (20), week due 3, 5, 10, 13, relevant learning outcome LO #A1: 1-2, A2: 5-6, A3: 7-9, A4: 10-13.
Projects / Lab.: Formative assessment.
Report: Formative assessment.
Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 8, relevant learning outcome LO # 1-7.
Final Exam: Summative assessment, time/number 2hr, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required prescribed textbooks (methodological, if any)	Engineering Mechanics, Part I: Statics. Ministry of Higher Education and Scientific Research.
Main references (sources)	Engineering Mechanics, Part I: Statics. Ministry of Higher Education and Scientific Research.
Recommended supporting books and references (scientific journals, reports, etc.)	Engineering Mechanics: Statics & Dynamics, 2022, Russell C. Hibbeler
Electronic references and websites	https://nptel.ac.in/courses/112106180?utm_source=chatgpt.com https://learnengineering.org?utm_source=chatgpt.com

Course Description Form

1. Course Name:	Computer I
2. Course Code:	UOT-003
3. Semester / Academic Year:	First / 2025-2026
4. Date of Preparation of this Description:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures, laboratories, and tutorials
6. Total Study Hours / Total Units:	2 hours weekly / 3 units
7. Course Coordinator Name (if more than one name is mentioned):	Omer I. Abdulkarem
8. Course Objectives	
9. Teaching and Learning Strategies	The teaching and learning strategy in this course is based on theoretical lectures, classroom discussion, exercises, applied problems, homework assignments, and laboratory or field activities when available. This strategy aims to encourage student participation, develop critical thinking, link theory with practical application, and monitor learning through questions, quizzes, reports, and examinations.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	2	Understand the topic and apply its concepts in solving exercises and practical problems.	History introduction: Evolution of computer science, pioneers and important milestones	Lecture and laboratory	Lab report / practical work
Second	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Data representation: Binary numbers, hexadecimal, character sets, ASCII and Unicode	Lecture and laboratory	Lab report / practical work
Third	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Computer components: CPU, memory, input/output devices, storage devices	Lecture and laboratory	Lab report / practical work
Fourth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Algorithms: Definition, representation, complexity, searching, sorting, optimization	Lecture and laboratory	Lab report / practical work
Fifth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Programming languages I	Lecture and laboratory	Lab report / practical work
Sixth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Programming languages II	Lecture and laboratory	Lab report / practical work
Seventh	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Midterm	Lecture and laboratory	Monthly / midterm exam
Eighth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Operating systems I	Lecture and laboratory	Lab report / practical work
Ninth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Operating systems II	Lecture and laboratory	Lab report / practical work
Tenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Applications I: Information Systems	Lecture and laboratory	Lab report / practical work
Eleventh	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Applications II: artificial intelligence	Lecture and laboratory	Lab report / practical work
Twelfth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Applications III: computer graphics, human-computer interaction	Lecture and laboratory	Lab report / practical work
Thirteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Networking	Lecture and laboratory	Lab report / practical work
Fourteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Internet	Lecture and laboratory	Lab report / practical work

Fifteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Cybersecurity: Threats, attacks, prevention, detection, mitigation	Lecture and laboratory	Lab report / practical work
Sixteenth	2	Assess students' understanding of the previous topics.	Final Exam	Lecture and laboratory	Lab report / practical work

11. Course Evaluation

Quizzes: Formative assessment, time/number 1, weight 15% (15), week due 2, 4, 6, 8, 10, relevant learning outcome LO #1, 3, 5 and 6.
Assignments: Formative assessment, time/number 1, weight 11% (11), week due 5, 14, relevant learning outcome LO # 2, 4, 7 and 8.
Lab: Formative assessment, time/number 14, weight 14% (14), week due Continuous.
Midterm Exam: Summative assessment, time/number 1.5, weight 10% (10), week due 7, relevant learning outcome LO # 1-5.
Final Exam: Summative assessment, time/number 3, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required prescribed textbooks (methodological, if any)	Computer Science Illuminated, by Dale, N and Lewis, J, 7th Ed, Jones & Bartlett Learning, 2020
Main references (sources)	Computer Science Illuminated, by Dale, N and Lewis, J, 7th Ed, Jones & Bartlett Learning, 2020
Recommended supporting books and references (scientific journals, reports, etc.)	None
Electronic references and websites	https://learn.microsoft.com/en-us/?utm_source=chatgpt.com https://www.tutorialspoint.com/computer_fundamentals/index.htm?utm_source=chatgpt.com

Course Description Form

1. Course Name:	Engineering Drawing
2. Course Code:	ENG-102
3. Semester / Academic Year:	First / 2025-2026
4. Date of Preparation of this Description:	01/11/2025
5. Available Attendance Forms:	Theoretical lectures, laboratories, and tutorials
6. Total Study Hours / Total Units:	2 hours weekly / 6 units
7. Course Coordinator Name (if more than one name is mentioned):	Sinan Noori Fayhan Mahmoud
8. Course Objectives	The module aims to shed light on how to use one of the most important computer aided drawing software - AutoCAD software - reviewing the most important information that the users need to utilize the most common program vision, to produce and extract 2D and 3D drawings. Qualifying students of the Dams and Water Resources Engineering Department to use the AutoCAD software to competently and efficiently realize engineering drawings, and assist them in implementing the details of the designs required in their projects.
9. Teaching and Learning Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Introduction - AutoCAD program interface elements, Coordinate systems in the program, Drafting Settings: Grid, Snap, Ortho	Lab and practical application	Lab report / practical work
Second	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Drawing commands: Line, Circle	Lab and practical application	Lab report / practical work
Third	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Drawing commands: Polygon, Rectangle	Lab and practical application	Lab report / practical work
Fourth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Modify tools: Erase, Copy, Move	Lab and practical application	Lab report / practical work
Fifth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Modify tools: Mirror, Rotate, Scale	Lab and practical application	Lab report / practical work
Sixth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Object Snap, View – Zoom, View - Pan	Lab and practical application	Lab report / practical work
Seventh	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Modify tools: Offset, Rectangular and Polar Array	Lab and practical application	Lab report / practical work
Eighth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Modify tools: Stretch, Trim, Extend	Lab and practical application	Lab report / practical work
Ninth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Drawing Commands: Point, Divide, Hatch	Lab and practical application	Lab report / practical work
Tenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Drawing Commands: Text, Mtext	Lab and practical application	Lab report / practical work

Eleventh	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Modify tools: Chamfer, Fillet, Explode	Lab and practical application	Lab report / practical work
Twelfth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Layers and drawing element settings: Color, Line type, Line Weight, Text Style	Lab and practical application	Lab report / practical work
Thirteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Dimensions and measurements	Lab and practical application	Lab report / practical work
Fourteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Printing and output	Lab and practical application	Lab report / practical work
Fifteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Basics of 3D Drawings	Lab and practical application	Lab report / practical work
Sixteenth	2	Assess students' understanding of the previous topics.	Preparatory week before the final Exam	Lab and practical application	Lab report / practical work

11. Course Evaluation

Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 3, 10, relevant learning outcome LO # 3 and 4.
Assignments: Formative assessment, time/number 2, weight 10% (10), week due 5, 12, relevant learning outcome LO # 1-4.
Projects / Lab.: Formative assessment, time/number 1, weight 10% (10), week due Continuous.
Report: Formative assessment, time/number 1, weight 10% (10), week due 13, relevant learning outcome LO # 1-6.
Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1-4.
Final Exam: Summative assessment, time/number 2hr, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required prescribed textbooks (methodological, if any)	Al-Allaf, Emad Hani, Architectural and Computer Aided Engineering Drawing, 2D Drawing Principles in AutoCAD®, 2018.
Main references (sources)	Al-Allaf, Emad Hani, Architectural and Computer Aided Engineering Drawing, 2D Drawing Principles in AutoCAD®, 2018.
Recommended supporting books and references (scientific journals, reports, etc.)	None
Electronic references and websites	https://www.mycadsite.com

Course Description Form

1. Course Name:	Introduction to Water Resources Engineering
2. Course Code:	DWRE-101
3. Semester / Academic Year:	First / 2025-2026
4. Date of Preparation of this Description:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures and tutorials
6. Total Study Hours / Total Units:	3 hours weekly / 6 units
7. Course Coordinator Name (if more than one name is mentioned):	Mohammed Faeq Yas Khudair
8. Course Objectives	Introducing students to the importance of water resources for human life and what is the primary role of the dams and water resources engineer in managing and developing these resources and ways to preserve them. Introducing students to the basic principles of irrigation and drainage engineering, modern and ancient irrigation methods, and ways to preserve water wealth. Introducing students to the basic principles of studying fluid flow in pipes and open channels and the most important methods used to measure and control it. Introducing the student to the concept of the hydrological cycle, the movement of water above and below the surface of the earth, and the study of evaporation from the surface of the soil and the surface of free water and the effect of weather factors on it.
9. Teaching and Learning Strategies	The main strategy that will be adopted in offering this course is to familiarize the student with the basic principles of the three branches (irrigation and drainage, hydraulics and hydrology) in the field of dams and water resources, to be an introduction that helps the student to delve deeper into the study of these disciplines in the next academic stages. At the same time, improving and expanding critical thinking skills, and introducing him to the importance of water resources in achieving a decent life for humanity. This is achieved through theoretical lectures, scientific reports, field visits, and interactive panel discussions.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Introduction to the course, with an explanation of the curriculum vocabulary and scientific sources.	Lecture and exercises	Class questions and assignments
Second	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Phases of the hydrological cycle/ Irrigation water sources/ Floods.	Lecture and exercises	Class questions and assignments
Third	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Dams and reservoirs / Types of Water reservoirs.	Lecture and exercises	Class questions and assignments
Fourth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Types of dams /catchment area Classification of dams.	Lecture and exercises	Class questions and assignments
Fifth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Hydraulic Structures/ Methods for measuring flow in open channels and pipes.	Lecture and exercises	Class questions and assignments
Sixth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Volumetric Measurements for discharge Measurement/ Velocity-Area Method for discharge Measurement/ Hydraulic Structures for discharge Measurement	Lecture and exercises	Class questions and assignments
Seventh	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Soil physical properties.	Lecture and exercises	Class questions and assignments

Eighth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Soil water forms/ Soil moisture content conventions/ Soil moisture content.	Lecture and exercises	Class questions and assignments
Ninth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	irrigation efficiency/Water conduction efficiency/ water and consistency of distribution	Lecture and exercises	Class questions and assignments
Tenth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Surface irrigation/sprinkler irrigation/ drip irrigation.	Lecture and exercises	Class questions and assignments
Eleventh	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Estimation of water consumption/ Evapotranspiration/ yield coefficient.	Lecture and exercises	Class questions and assignments
Twelfth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Water sources in Iraq.	Lecture and exercises	Class questions and assignments
Thirteenth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Control and storage projects.	Lecture and exercises	Class questions and assignments
Fourteenth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Executed large dams.	Lecture and exercises	Class questions and assignments
Fifteenth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Irrigation projects in Iraq.	Lecture and exercises	Class questions and assignments
Sixteenth	3	Assess students' understanding of the previous topics.	Preparatory week before the final Exam	Lecture and exercises	Class questions and assignments

11. Course Evaluation

Quizzes: Formative assessment, time/number 3, weight 15% (10), week due 5, 10,13, relevant learning outcome LO #1, 2 and 3.
Assignments: Formative assessment, time/number 3, weight 15% (10), week due 3, 7,12, relevant learning outcome LO #1, 2 and 3.
Projects / Lab.: Formative assessment, time/number 0, weight 0% (10).
Report: Formative assessment, time/number 1, weight 10% (10), week due 13, relevant learning outcome LO #1, 2 and 3.
Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 8, relevant learning outcome LO #1and 2.
Final Exam: Summative assessment, time/number 3hr, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required prescribed textbooks (methodological, if any)	Irrigation and drainage book in Iraq and the Arab world. Written by Dr. Najeeb Kharofa, Dr. Mahdi Al-Sahhaf, Dr. Wafiq Al-Khashab
Main references (sources)	Irrigation and drainage book in Iraq and the Arab world. Written by Dr. Najeeb Kharofa, Dr. Mahdi Al-Sahhaf, Dr. Wafiq Al-Khashab
Recommended supporting books and references (scientific journals, reports, etc.)	On-farm irrigation systems engineering\by A.Y.Hachum, and H.I.Yasin. textbook- Mosul University,1992.
Electronic references and websites	None

Course Description Form

1. Course Name:	Human Rights and Democracy
2. Course Code:	UOT-004
3. Semester / Academic Year:	First / 2025-2026
4. Date of Preparation of this Description:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures and tutorials
6. Total Study Hours / Total Units:	2 hours weekly / 2 units
7. Course Coordinator Name (if more than one name is mentioned):	Abdulrahman Zedan
8. Course Objectives	The aim of studying the democracy and human rights topics is to: Understand the concept of human rights and explore their sources, including international, regional, national, and religious sources. Define administrative corruption, explore its types, and understand its detrimental effects on society. Study methods to combat administrative corruption and promote transparency, accountability, and good governance. Trace the historical development and evolution of human rights, examining key milestones and movements that have shaped the modern understanding of human rights. Differentiate between different categories of human rights, including civil and political rights, economic and social rights, and environmental, cultural, and developmental rights. Explore legal, institutional, and societal guarantees to prevent human rights violations, including guarantees of human rights in Islam, national-level protections, and international safeguards. Comprehend the concept of democracy, including its principles, values, and various forms of democratic governance such as direct, semi-direct, indirect, and digital democracy. Overall, studying these topics aims to develop a comprehensive understanding of human rights, democracy, and combating corruption, empowering individuals to actively promote and protect human rights and democratic values in society.
9. Teaching and Learning Strategies	When it comes to learning and teaching strategies for a human rights module, there are several approaches can be taken to enhance understanding and engagement. Here are some effective strategies: Interactive Discussions: Encourage students to actively participate in discussions, debates, and group activities. This promotes critical thinking, allows for different perspectives to be shared, and fosters a deeper understanding of human rights issues. Case Studies: Present real-life case studies that highlight human rights violations or achievements. Analyzing these cases helps students apply theoretical concepts to practical situations and develops their problem-solving skills. Research Projects: Assign research projects on specific human rights topics or issues. This encourages independent learning, critical analysis, and the development of research skills. Collaborative Learning: Foster collaboration among students through group projects or assignments. This encourages teamwork, peer learning, and the exchange of diverse perspectives. Assessment Variety: Use a variety of assessment methods, including essays, presentations, debates, and quizzes, to assess students' understanding of human rights concepts and their ability to apply them to real-world situations.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method

First	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Definition of human rights and sources of rights (international sources / regional sources / national sources / religious sources).	Lecture and exercises	Class questions and assignments
Second	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Characteristics of human rights.	Lecture and exercises	Class questions and assignments
Third	2	Understand the topic and apply its concepts in solving exercises and practical problems.	The emergence and evolution of human rights.	Lecture and exercises	Class questions and assignments
Fourth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Types of human rights / civil and political rights. Economic and social rights. Environmental, cultural, and developmental rights.	Lecture and exercises	Class questions and assignments
Fifth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Guarantees to prevent human rights violations / guarantees of human rights in Islam.	Lecture and exercises	Class questions and assignments
Sixth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Guarantees for the protection of human rights at the national level.	Lecture and exercises	Class questions and assignments
Seventh	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Guarantees of human rights at the international level.	Lecture and exercises	Class questions and assignments
Eighth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	The concept of democracy.	Lecture and exercises	Class questions and assignments
Ninth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Characteristics of a democratic system.	Lecture and exercises	Class questions and assignments
Tenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Forms of democratic governance (direct democracy / semi-direct democracy / indirect democracy).	Lecture and exercises	Class questions and assignments
Eleventh	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Digital democracy / definition and advantages and disadvantages of digital democracy / manifestations of digital democracy.	Lecture and exercises	Class questions and assignments
Twelfth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	The Islamic stance on democracy.	Lecture and exercises	Class questions and assignments
Thirteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Critique of the democratic system.	Lecture and exercises	Class questions and assignments
Fourteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Administrative corruption / definition and types.	Lecture and exercises	Class questions and assignments
Fifteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Methods to combat administrative corruption.	Lecture and exercises	Class questions and assignments
Sixteenth	2	Assess students' understanding of the previous topics.	Preparatory week before the final Exam	Lecture and exercises	Class questions and assignments

11. Course Evaluation

Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, relevant learning outcome LO #2, 4, 6 and 8.
Assignments: Formative assessment, time/number 2, weight 10% (10), week due 3, 5, 8, 11, 13, relevant learning outcome LO # 1, 3, 7, 6, 9 and 10.
Projects / Lab.: Formative assessment, time/number 1, weight 10% (10), week due Continuous.
Report: Formative assessment, time/number 1, weight 10% (10), week due 13, relevant learning outcome LO # 2,4,5,7,9and 10.
Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1-7.
Final Exam: Summative assessment, time/number 3 hr, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required prescribed textbooks (methodological, if any)	Guarantees and Protection of Human Rights According to International Law and National Legislation / Nabil Abdulrahman Naser Al-Din
Main references (sources)	Guarantees and Protection of Human Rights According to International Law and National Legislation / Nabil Abdulrahman Naser Al-Din
Recommended supporting books and references (scientific journals, reports, etc.)	Democracy and Human Rights / Dr. Amir Abdulaziz
Electronic references and websites	None

Course Description Form

1. Course Name:	Arabic Language I
2. Course Code:	UOT-001
3. Semester / Academic Year:	First / 2025-2026
4. Date of Preparation of this Description:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures and tutorials
6. Total Study Hours / Total Units:	2 hours weekly / 2 units
7. Course Coordinator Name (if more than one name is mentioned):	Wasen Younis
8. Course Objectives	1. Develop students' skills in reading, writing, and expression in Arabic. 2. Introduce basic grammatical and spelling rules. 3. Train students to understand and analyze literary and Quranic texts. 4. Address common mistakes in writing and pronunciation. 5. Strengthen the ability to use Arabic correctly in academic contexts.
9. Teaching and Learning Strategies	The teaching and learning strategy in this course is based on theoretical lectures, classroom discussion, exercises, applied problems, homework assignments, and laboratory or field activities when available. This strategy aims to encourage student participation, develop critical thinking, link theory with practical application, and monitor learning through questions, quizzes, reports, and examinations.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Surat Al-Baqarah, verses 260-263	Lecture and exercises	Class questions and assignments
Second	2	Understand the topic and apply its concepts in solving exercises and practical problems.	A noble Prophetic hadith	Lecture and exercises	Class questions and assignments
Third	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Verses from a poem by Antarah ibn Shaddad	Lecture and exercises	Class questions and assignments
Fourth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Morphological scale	Lecture and exercises	Class questions and assignments
Fifth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Plurals in Arabic	Lecture and exercises	Class questions and assignments
Sixth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Assigning verbs to pronouns	Lecture and exercises	Class questions and assignments
Seventh	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Verb conjugation	Lecture and exercises	Class questions and assignments
Eighth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Midterm exam	Lecture and exercises	Class questions and assignments
Ninth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Arabic alphabet letters	Lecture and exercises	Class questions and assignments
Tenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Rules for writing punctuation marks	Lecture and exercises	Class questions and assignments
Eleventh	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Rules for writing Hamza	Lecture and exercises	Class questions and assignments
Twelfth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Lexicographical schools	Lecture and exercises	Class questions and assignments

Thirteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Meanings of unfamiliar words in the Holy Quran	Lecture and exercises	Class questions and assignments
Fourteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	The methodology of the Al-Ain and Al-Asas lexical schools	Lecture and exercises	Class questions and assignments
Fifteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Common linguistic mistakes	Lecture and exercises	Class questions and assignments
Sixteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Final exam	Lecture and exercises	Class questions and assignments

11. Course Evaluation

Quizzes: Formative assessment, time/number 4, weight 20% (20), week due 3, 5, 7,, ,9,11,13, relevant learning outcome LO #1, 2,3,4....., ,11.
Assignments (Homeworks): Formative assessment, time/number 6, weight 15% (15), week due 2, 4, 6, 10,12,14, relevant learning outcome LO # 1, 2, 3, 4 .....,,11.
Discussions: Formative assessment, time/number 7, weight 5% (5), week due Continuous.
Seminar: , time/number 3, weight 5%(5).
Midterm Exam: Summative assessment, time/number 2, weight 10% (10), week due 8, relevant learning outcome LO # 1-7.
Final Exam: Summative assessment, time/number 3, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100%
(100 Marks).

12. Learning and Teaching Resources

Required prescribed textbooks (methodological, if any)	Arabic Language for Non-Specialist Departments
Main references (sources)	Arabic Language for Non-Specialist Departments
Recommended supporting books and references (scientific journals, reports, etc.)	Al-Tafsir Al-Wasit, Prof. Dr. Wahbah Al-Zuhayli Al-Minhaj in Grammar and Parsing, Muhammad Al-Antaki
Electronic references and websites	N/A

Course Description Form

1. Course Name:	Calculus II
2. Course Code:	MATH-102
3. Semester / Academic Year:	Second / 2025-2026
4. Date of Preparation of this Description:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures and tutorials
6. Total Study Hours / Total Units:	4 hours weekly / 6 units
7. Course Coordinator Name (if more than one name is mentioned):	Firas Hazim Jasim
8. Course Objectives	Matrices and determinants, Transcendental Functions, Inverse Functions, Derivatives and integral of inverse trigonometric functions, Exponential and logarithmic functions, Derivatives and integrals involving logarithmic and exponential functions, Graphs and applications involving logarithmic and exponential functions, Hyperbolic functions, Hopital's Rule, An overview of integration methods: Trigonometric substitutions, Trigonometric integral, Integration by parts, Integrating rational functions by partial fractions, Numerical integration; Simpson's rule.
9. Teaching and Learning Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Matrices and determinants.	Lecture and exercises	Class questions and assignments
Second	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Transcendental Functions.	Lecture and exercises	Class questions and assignments
Third	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Inverse Functions.	Lecture and exercises	Class questions and assignments
Fourth	4	Assess students' understanding of the previous topics.	Derivatives and integral of inverse trigonometric functions + (quiz 1)	Lecture and exercises	Quiz
Fifth	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Exponential and logarithmic functions.	Lecture and exercises	Class questions and assignments
Sixth	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Derivatives and integrals involving logarithmic and exponential functions.	Lecture and exercises	Class questions and assignments
Seventh	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Graphs and applications involving logarithmic and exponential functions+ Hyperbolic functions.	Lecture and exercises	Class questions and assignments
Eighth	4	Assess students' understanding of the previous topics.	Monthly Exam 1	Lecture and exercises	Monthly / midterm exam
Ninth	4	Assess students' understanding of the previous topics.	Hopital's Rule + (quiz 2)	Lecture and exercises	Quiz
Tenth	4	Understand the topic and apply its concepts in solving exercises and practical problems.	An overview of integration methods:	Lecture and exercises	Class questions and assignments
Eleventh	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Trigonometric substitutions + Trigonometric integral.	Lecture and exercises	Class questions and assignments
Twelfth	4	Assess students' understanding of the previous topics.	Integration by parts + (quiz 1)	Lecture and exercises	Quiz

Thirteenth	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Integrating rational functions by partial fractions.	Lecture and exercises	Class questions and assignments
Fourteenth	4	Assess students' understanding of the previous topics.	Monthly Exam 2	Lecture and exercises	Monthly / midterm exam
Fifteenth	4	Understand the topic and apply its concepts in solving exercises and practical problems.	Numerical integration; Simpson's rule.	Lecture and exercises	Class questions and assignments
Sixteenth	4	Assess students' understanding of the previous topics.	Preparatory week before the final Exam	Lecture and exercises	Class questions and assignments

11. Course Evaluation

Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, relevant learning outcome LO #1, 2, 10 and 11.
Assignments: Formative assessment, time/number 2, weight 10% (10), week due 2, 12, relevant learning outcome LO # 3, 4, 6 and 7.
Projects / Lab.: Formative assessment, time/number 1, weight 10% (10), week due Continuous, relevant learning outcome All.
Report: Formative assessment, time/number 0, weight 0% (0), week due 0, relevant learning outcome LO # 5, 8 and 10.
Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1-7.
Final Exam: Summative assessment, time/number 3hr, weight 60% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required prescribed textbooks (methodological, if any)	Calculus I By: Thomas
Main references (sources)	Calculus I By: Thomas
Recommended supporting books and references (scientific journals, reports, etc.)	Calculus I By: Thomas 2018
Electronic references and websites	None

Course Description Form

1. Course Name:	Engineering Mechanics II
2. Course Code:	ENG-103
3. Semester / Academic Year:	Second / 2025-2026
4. Date of Preparation of this Description:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures and tutorials
6. Total Study Hours / Total Units:	3 hours weekly / 5 units
7. Course Coordinator Name (if more than one name is mentioned):	Saad Mawlood Saab Hassan Al-Nasiri
8. Course Objectives	To develop problem solving skills and understanding of engineering mechanics (dynamic) throughout the context of this course. To understand the principles of engineering mechanics II like friction principals and types. This course also deals with Centers and Centers of Gravity of bodies. To understand the basics of moment of Inertia. To understand force distribution in trusses and frames. To perform force analysis using the joint method and the section method.
9. Teaching and Learning Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and homework assignments.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Friction: The nature of friction, mechanical friction, Coefficient of Friction, Friction issues	Lecture and exercises	Class questions and assignments
Second	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Friction: wedges, Frictional forces in the belts	Lecture and exercises	Class questions and assignments
Third	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Centers and Centers of Gravity: The importance of centers, Centers of spaces and lines, Determination of centers by integration, Centers of compound shapes	Lecture and exercises	Class questions and assignments
Fourth	3	Assess students' understanding of the previous topics.	Problem solving + Quiz 1	Lecture and exercises	Quiz
Fifth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Moment of Inertia: Units of measurement and signals, The moment of polar inertia, swirl radius, The equation for transferring the moment of inertia,	Lecture and exercises	Class questions and assignments
Sixth	3	Assess students' understanding of the previous topics.	Moment of Inertia: Moment of Inertia by Integration, The factorial of inertia, Maximum and minimum values of moment of inertia (Mohr circuit) + Quiz 2	Lecture and exercises	Quiz
Seventh	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Problem solving	Lecture and exercises	Class questions and assignments
Eighth	3	Assess students' understanding of the previous topics.	Mid-term Exam + introduction Kinematics of Particles	Lecture and exercises	Monthly / midterm exam
Ninth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Kinematics of Particles: Rectilinear motion, ,	Lecture and exercises	Class questions and assignments
Tenth	3	Assess students' understanding of the previous topics.	Kinematics of Particles: Plane curvilinear motion + Quiz 3	Lecture and exercises	Quiz

Eleventh	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Circular motion	Lecture and exercises	Class questions and assignments
Twelfth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Dynamic friction + Problem solving	Lecture and exercises	Class questions and assignments
Thirteenth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Work and energy: Equations, Work and energy applications,	Lecture and exercises	Class questions and assignments
Fourteenth	3	Assess students' understanding of the previous topics.	Power, Efficiency + Quiz 4	Lecture and exercises	Quiz
Fifteenth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Problem solving	Lecture and exercises	Class questions and assignments
Sixteenth	3	Assess students' understanding of the previous topics.	Preparatory week before the final Exam – review or open session for general questions	Lecture and exercises	Class questions and assignments

11. Course Evaluation

Quizzes (Q): Formative assessment, time/number 4, weight 20% (20), week due 4, 6, 10, 14, relevant learning outcome LO #Q1: 1-3, Q2: 4-6, Q3: 8-10, Q4: 11-13.
Assignments (A): Formative assessment, time/number 4, weight 20% (20), week due 3, 5, 10, 13, relevant learning outcome LO #A1: 1-2, A2: 5-6, A3: 7-9, A4: 10-13.
Projects / Lab.: Formative assessment.
Report: Formative assessment.
Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 8, relevant learning outcome LO # 1-7.
Final Exam: Summative assessment, time/number 2hr, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required prescribed textbooks (methodological, if any)	Engineering Mechanics, Part II: Dynamics. Ministry of Higher Education and Scientific Research.
Main references (sources)	Engineering Mechanics, Part II: Dynamics. Ministry of Higher Education and Scientific Research.
Recommended supporting books and references (scientific journals, reports, etc.)	Engineering Mechanics: Statics & Dynamics, 2022, Russell C. Hibbeler
Electronic references and websites	None

Course Description Form

1. Course Name:	Computer II
2. Course Code:	UOT-031
3. Semester / Academic Year:	Second / 2025-2026
4. Date of Preparation of this Description:	01/11/2025
5. Available Attendance Forms:	Theoretical lectures, laboratories, and tutorials
6. Total Study Hours / Total Units:	2 hours weekly / 3 units
7. Course Coordinator Name (if more than one name is mentioned):	Omer I Abdulkarem
8. Course Objectives	
9. Teaching and Learning Strategies	The teaching and learning strategy in this course is based on theoretical lectures, classroom discussion, exercises, applied problems, homework assignments, and laboratory or field activities when available. This strategy aims to encourage student participation, develop critical thinking, link theory with practical application, and monitor learning through questions, quizzes, reports, and examinations.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Introduction to programming in MATLAB, Principles of MATLAB	Lecture and laboratory	Lab report / practical work
Second	2	Understand the topic and apply its concepts in solving exercises and practical problems.	MATLAB environment and commands	Lecture and laboratory	Lab report / practical work
Third	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Linear Algebra and matrices	Lecture and laboratory	Lab report / practical work
Fourth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Fundamental engineering computing	Lecture and laboratory	Lab report / practical work
Fifth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Save, load, display and print commands	Lecture and laboratory	Lab report / practical work
Sixth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Communication with Excel	Lecture and laboratory	Lab report / practical work
Seventh	2	Assess students' understanding of the previous topics.	Midterm exam	Lecture and laboratory	Monthly / midterm exam
Eighth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	2D and 3D plotting	Lecture and laboratory	Lab report / practical work
Ninth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Solutions to systems of linear equations	Lecture and laboratory	Lab report / practical work
Tenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Conditional statements	Lecture and laboratory	Lab report / practical work
Eleventh	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Loops	Lecture and laboratory	Lab report / practical work
Twelfth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	MATLAB scripts and functions	Lecture and laboratory	Lab report / practical work
Thirteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Polynomials, including differentiation and integration	Lecture and laboratory	Lab report / practical work
Fourteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Using MATLAB for simple engineering problems	Lecture and laboratory	Lab report / practical work

Fifteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Control flow and operators	Lecture and laboratory	Lab report / practical work
Sixteenth	2	Assess students' understanding of the previous topics.	Final Exam	Lecture and laboratory	Lab report / practical work

11. Course Evaluation

Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, 12, 14, relevant learning outcome LO #1, 2, 3, and 4.
Assignments (Home Works): Formative assessment, time/number 5, weight 10% (10), week due 2, 4, 6, 8, 10, relevant learning outcome LO # 1, 2, 3, 4, 5 and 6.
In Lab Application: Formative assessment, time/number 15, weight 20% (8), week due Continuous.
Midterm Exam: Summative assessment, time/number 2, weight 10% (10), week due 7, relevant learning outcome LO # 1-5.
Final Exam: Summative assessment, time/number 3, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100%
(100 Marks).

12. Learning and Teaching Resources

Required prescribed textbooks (methodological, if any)	INTRODUCTION TO MATLAB FOR ENGINEERING STUDENTS, David Houcque Northwestern University, (version 1.2, August 2005)
Main references (sources)	INTRODUCTION TO MATLAB FOR ENGINEERING STUDENTS, David Houcque Northwestern University, (version 1.2, August 2005)
Recommended supporting books and references (scientific journals, reports, etc.)	None
Electronic references and websites	N/A

Course Description Form

1. Course Name:	Construction Materials
2. Course Code:	DWRE-102
3. Semester / Academic Year:	Second / 2025-2026
4. Date of Preparation of this Description:	
5. Available Attendance Forms:	Theoretical lectures, laboratories, and tutorials
6. Total Study Hours / Total Units:	2 hours weekly / 4 units
7. Course Coordinator Name (if more than one name is mentioned):	Abdullah Saeb Tais Jabr
8. Course Objectives	
9. Teaching and Learning Strategies	The teaching and learning strategy in this course is based on theoretical lectures, classroom discussion, exercises, applied problems, homework assignments, and laboratory or field activities when available. This strategy aims to encourage student participation, develop critical thinking, link theory with practical application, and monitor learning through questions, quizzes, reports, and examinations.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Classification of engineering materials and their properties	Lecture and laboratory	Lab report / practical work
Second	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Mechanical properties of the material (types of forces) hooks law, strain, stresses	Lecture and laboratory	Lab report / practical work
Third	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Exercises on the mechanical properties of matter	Lecture and laboratory	Lab report / practical work
Fourth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Clay bricks (classification of soils in terms of granular gradation and the most important clay minerals)	Lecture and laboratory	Lab report / practical work
Fifth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Stages of making clay bricks (forming, drying, and burning methods) and their properties	Lecture and laboratory	Lab report / practical work
Sixth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Other types of non-clay bricks (lime-sand bricks, concrete bricks, glass bricks)	Lecture and laboratory	Lab report / practical work
Seventh	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Building blocks (stabilized soil blocks, concrete building blocks, thermo-stone blocks)	Lecture and laboratory	Lab report / practical work
Eighth	2	Assess students' understanding of the previous topics.	Midterm exam	Lecture and laboratory	Monthly / midterm exam
Ninth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Types of binders (plaster)	Lecture and laboratory	Lab report / practical work
Tenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Manufacturing of Gypsum and its types according to the Iraqi and British specifications	Lecture and laboratory	Lab report / practical work
Eleventh	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Properties of lime, and its uses in construction, properties of cement and lime	Lecture and laboratory	Lab report / practical work
Twelfth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Types of Portland and non-Portland cement	Lecture and laboratory	Lab report / practical work
Thirteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	The effectiveness of pozzolana	Lecture and laboratory	Lab report / practical work

Fourteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Types of additives and their function	Lecture and laboratory	Lab report / practical work
Fifteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Usage of additives in construction materials	Lecture and laboratory	Lab report / practical work
Sixteenth	2	Assess students' understanding of the previous topics.	Final Exam	Lecture and laboratory	Lab report / practical work

11. Course Evaluation

Quizzes: Formative assessment, time/number 4, weight 12% (12), week due 4,6,8,10, relevant learning outcome 1,2,3,4.
Assignments: Formative assessment, time/number 3, weight 6% (6), week due 8, 10, 12, relevant learning outcome 1,2,3.
Seminars: Formative assessment, time/number 3, weight 6% (6), week due Continuous, relevant learning outcome 1,2,3,4,5,6,7.
Reports: Formative assessment, time/number 4, weight 16% (16), week due Continuous, relevant learning outcome 1,2,3,4.
Midterm Exam: Summative assessment, time/number 2, weight 10% (10), week due 7, relevant learning outcome LO # 1-3.
Final Exam: Summative assessment, time/number 3, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required prescribed textbooks (methodological, if any)	None
Main references (sources)	None
Recommended supporting books and references (scientific journals, reports, etc.)	None
Electronic references and websites	None

Course Description Form

1. Course Name:	Analytical Chemistry
2. Course Code:	DWRE-104
3. Semester / Academic Year:	Second / 2025-2026
4. Date of Preparation of this Description:	01/11/2025
5. Available Attendance Forms:	Theoretical lectures, laboratories, and tutorials
6. Total Study Hours / Total Units:	2 hours weekly / 5 units
7. Course Coordinator Name (if more than one name is mentioned):	Tamara Loay
8. Course Objectives	
9. Teaching and Learning Strategies	The teaching and learning strategy in this course is based on theoretical lectures, classroom discussion, exercises, applied problems, homework assignments, and laboratory or field activities when available. This strategy aims to encourage student participation, develop critical thinking, link theory with practical application, and monitor learning through questions, quizzes, reports, and examinations.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Introduction of analytical chemistry, quantitative analysis, qualitative analysis	Lecture and laboratory	Lab report / practical work
Second	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Gravimetric calculations of chemical analysis	Lecture and laboratory	Lab report / practical work
Third	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Calculations involving concentrations of solutions, physical methods, Molar Methods, Equivalent Methods	Lecture and laboratory	Lab report / practical work
Fourth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Dilution of solutions	Lecture and laboratory	Lab report / practical work
Fifth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Analysis of samples by titration with standard solution	Lecture and laboratory	Lab report / practical work
Sixth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Calculation of Oxidation – Reduction titration, Equilibrium reactions	Lecture and laboratory	Lab report / practical work
Seventh	2	Assess students' understanding of the previous topics.	Midterm Exam	Lecture and laboratory	Monthly / midterm exam
Eighth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Acid – base equilibrium and PH of solutions, Equilibrium constant	Lecture and laboratory	Lab report / practical work
Ninth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Expression of equilibrium constant in acidic medium	Lecture and laboratory	Lab report / practical work
Tenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Expression of equilibrium constant in basic medium	Lecture and laboratory	Lab report / practical work
Eleventh	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Calculation of pH of aqueous solution, Weak acid plus its salt	Lecture and laboratory	Lab report / practical work
Twelfth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Titration curves, Strong acid- strong base, Weak acid – strong base	Lecture and laboratory	Lab report / practical work
Thirteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	strong acid – weak base, weak acid – weak base	Lecture and laboratory	Lab report / practical work

Fourteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Acid — Base indicator	Lecture and laboratory	Lab report / practical work
Fifteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	pH dilution	Lecture and laboratory	Lab report / practical work
Sixteenth	2	Assess students' understanding of the previous topics.	Final Exam	Lecture and laboratory	Lab report / practical work

11. Course Evaluation

Quizzes: Formative assessment, time/number 2, weight 15% (15), week due 5, 8,12, relevant learning outcome LO #1, 2, 3, and 4.
Assignments (Home Works): Formative assessment, time/number 5, weight 10% (10), week due 2, 4, 6, 8, 10, relevant learning outcome LO # 1, 2, 3, 4, and 5.
Laboratory reports: Formative assessment, time/number 15, weight 15% (15), week due Continuous, relevant learning outcome LO # 4.
Midterm Exam: Summative assessment, time/number 2, weight 10% (10), week due 7, relevant learning outcome LO # 1-5.
Final Exam: Summative assessment, time/number 3, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100%
(100 Marks).

12. Learning and Teaching Resources

Required prescribed textbooks (methodological, if any)	Analytical chemistry (Book)/ 7th Edition Gary D. Christian, Purnendu K. Dasgupta, Kevin A. Schug ISBN: 978-0-470-88757-8
Main references (sources)	Analytical chemistry (Book)/ 7th Edition Gary D. Christian, Purnendu K. Dasgupta, Kevin A. Schug ISBN: 978-0-470-88757-8
Recommended supporting books and references (scientific journals, reports, etc.)	General chemistry book
Electronic references and websites	N/A

Course Description Form	
1. Course Name:	Engineering Statistics
2. Course Code:	DWRE-103
3. Semester / Academic Year:	Second / 2025-2026
4. Date of Preparation of this Description:	12/06/2023
5. Available Attendance Forms:	Theoretical lectures and tutorials
6. Total Study Hours / Total Units:	3 hours weekly / 5 units
7. Course Coordinator Name (if more than one name is mentioned):	Omer Siry
8. Course Objectives	1. Introduce students to the fundamentals of engineering statistics and statistical data. 2. Enable students to organize, present, and analyze data using tables and graphs. 3. Study measures of central tendency, dispersion, probability, and common distributions. 4. Train students to conduct statistical tests and hypothesis testing. 5. Introduce regression, correlation, and the least squares method for engineering applications.
9. Teaching and Learning Strategies	This course has several components that include lectures, individual & group assignments, and e-learning platforms. Exercises involving the use of computer applications tools to understand the engineering statistical processes. The course will be taught in English in addition to the Arabic, and all mandatory assignments have to be submitted within the deadlines to be admitted to the exams.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Introduction, Nature of statistical data and symbols,	Lecture and exercises	Class questions and assignments
Second	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Viewing the data, the table method, the drawing method.	Lecture and exercises	Class questions and assignments
Third	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Measures of central tendency, the arithmetic mean, median, and mode	Lecture and exercises	Class questions and assignments
Fourth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Measures of the mean, dispersion, and range.	Lecture and exercises	Class questions and assignments
Fifth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	The average deviation, variance, coefficient of variation.	Lecture and exercises	Class questions and assignments
Sixth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Principles of probability theory	Lecture and exercises	Class questions and assignments
Seventh	3	Assess students' understanding of the previous topics.	Mid-term Exam + conditional probability.	Lecture and exercises	Monthly / midterm exam
Eighth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Binomial distribution .	Lecture and exercises	Class questions and assignments
Ninth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	normal distribution.	Lecture and exercises	Class questions and assignments
Tenth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Hypothesis testing approach.	Lecture and exercises	Class questions and assignments
Eleventh	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Statistical tests , Z- test.	Lecture and exercises	Class questions and assignments

Twelfth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Chi square test .	Lecture and exercises	Class questions and assignments
Thirteenth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	F-test .	Lecture and exercises	Class questions and assignments
Fourteenth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	Regression and correlation .	Lecture and exercises	Class questions and assignments
Fifteenth	3	Understand the topic and apply its concepts in solving exercises and practical problems.	the drawing method, the least squares method , the linear correlation.	Lecture and exercises	Class questions and assignments
Sixteenth	3	Assess students' understanding of the previous topics.	Preparatory week before the final Exam.	Lecture and exercises	Class questions and assignments

11. Course Evaluation

Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, relevant learning outcome LO #1, 2, 3, 4, 5, 6, and 7.
Assignments: Formative assessment, time/number 2, weight 10% (10), week due 2, 14, relevant learning outcome LO # 3, 4, 8, 9 and 10.
Projects / Lab.: Formative assessment, time/number ----, weight --------, week due ---------.
Report: Formative assessment, time/number 2, weight 10% (20), week due 6 and 11, relevant learning outcome LO # 5, 8 and 10.
Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1-5.
Final Exam: Summative assessment, time/number 3hr, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required prescribed textbooks (methodological, if any)	Introduction to Statistics, Dr. Khasha Mahmoud Al-Rawi, College of Agriculture and Forestry, University of Mosul, 2nd Edition, 2000.
Main references (sources)	Introduction to Statistics, Dr. Khasha Mahmoud Al-Rawi, College of Agriculture and Forestry, University of Mosul, 2nd Edition, 2000.
Recommended supporting books and references (scientific journals, reports, etc.)	An Introduction to the Science of Statistics: From Theory to Implementation, Preliminary Edition, Joseph C. Watkins
Electronic references and websites	https://www.infobooks.org/free-pdf-books/math/statistics/

Course Description Form

1. Course Name:	English Language I
2. Course Code:	UOT-002
3. Semester / Academic Year:	Second / 2025-2026
4. Date of Preparation of this Description:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures and tutorials
6. Total Study Hours / Total Units:	2 hours weekly / 2 units
7. Course Coordinator Name (if more than one name is mentioned):	Firas Hazem Jasim Mohammed
8. Course Objectives	1. The main objective of this course is to emphasize the fundamental language skills of reading, writing, speaking, listening, thinking, viewing, and presenting. 2. The course includes studies of various literary genres: short story, novel, and non-fiction. 3. The course also helps students to improve their English language grammar and reading abilities, and becoming more effective use of grammar and natural self-expression in English.
9. Teaching and Learning Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Parts of speech. Pronouns.	Lecture and exercises	Class questions and assignments
Second	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Subject, Lexical verbs, Auxiliry verbs, Regular Verb, Irregular Verb.	Lecture and exercises	Class questions and assignments
Third	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Recognizing Objects and Complements.	Lecture and exercises	Class questions and assignments
Fourth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Adverbials.	Lecture and exercises	Class questions and assignments
Fifth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Tenses.	Lecture and exercises	Class questions and assignments
Sixth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Tenses.	Lecture and exercises	Class questions and assignments
Seventh	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Active voice.	Lecture and exercises	Class questions and assignments
Eighth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Passive voice.	Lecture and exercises	Class questions and assignments
Ninth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Convert from active voice to passive voice and vice versa.	Lecture and exercises	Class questions and assignments
Tenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Positive, comparative and superlative.	Lecture and exercises	Class questions and assignments
Eleventh	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Conditional sentences, if-clauses type I, II, III.	Lecture and exercises	Class questions and assignments
Twelfth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Reading some of passages from IELTS books.	Lecture and exercises	Class questions and assignments

Thirteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	English reading practice for beginners.	Lecture and exercises	Class questions and assignments
Fourteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	Writing some of passages from IELTS books.	Lecture and exercises	Class questions and assignments
Fifteenth	2	Understand the topic and apply its concepts in solving exercises and practical problems.	English writing practice for beginners.	Lecture and exercises	Class questions and assignments
Sixteenth	2	Assess students' understanding of the previous topics.	Preparatory week before the final Exam	Lecture and exercises	Class questions and assignments

11. Course Evaluation

Quizzes: Formative assessment, time/number 3, weight 10% (10), week due 4, 9, 12, relevant learning outcome LO #1, 2, 10 and 11.
Assignments: Formative assessment, time/number 4, weight 10% (10), week due 2, 12, relevant learning outcome LO # 3, 4, 6 and 7.
Projects / Lab.: Formative assessment, weight 0% (0).
Report: Formative assessment, time/number 1, weight 5% (5), week due 9, relevant learning outcome LO # 5, 8 and 10.
Midterm Exam: Summative assessment, time/number 1hr, weight 15% (15), week due 8, relevant learning outcome LO # 1-4.
Final Exam: Summative assessment, time/number 3hr, weight 60% (60), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required prescribed textbooks (methodological, if any)	Ronald Carter and Michael McCarthy. Cambridge grammar of English: A comprehensive guide. Cambridge: Cambridge University Press, 2006. Rodney Huddleston, Geoffrey K. Pullum. The Cambridge Grammar of the English Language, 2002.
Main references (sources)	Ronald Carter and Michael McCarthy. Cambridge grammar of English: A comprehensive guide. Cambridge: Cambridge University Press, 2006. Rodney Huddleston, Geoffrey K. Pullum. The Cambridge Grammar of the English Language, 2002.
Recommended supporting books and references (scientific journals, reports, etc.)	Collins Reading for IELTS by Els Van Geyte, 2011.
Electronic references and websites	None

Course Description Form

Course Name:
Calculus III
Course Code:
MATH-201
Semester / Academic Year: Annual
Second / 2025-2026
Date of Preparation of this Description
31/5/2026
Available Attendance Forms:
Total Study Hours / Total Units:
4
Course Coordinator Name (if more than one name is mentioned)
Firas Hazem Jasim Mohammed
Course Objectives

To develop problem solving skills and understanding of Polar coordinates system and its applications.
To understand Vectors and Geometry of Space, Scalar Product, Cross Product
This course deals with the basic concept of Partial Differentiation.
To understand Double Integrals and its applications.
To perform Infinite Sequences and Series analysis.

Teaching and Learning Strategies

The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of exercises involving some problems that are interesting to the students in mathematics scope.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method

First	4	Understand and apply the concepts of Polar coordinates system, Graphing in polar coordinates system.	Polar coordinates system, Graphing in polar coordinates system	Polar coordinates system, Graphing in polar coordinates system	Polar coordinates system, Graphing in polar coordinates system
Second	4	Understand and apply the concepts of Area in polar coordinates system, Curve length in polar coordinates system.	Area in polar coordinates system, Curve length in polar coordinates system	Area in polar coordinates system, Curve length in polar coordinates system	Area in polar coordinates system, Curve length in polar coordinates system
Third	4	Understand and apply the concepts of Vectors and Geometry of Space, Space coordinate and space vector.	Vectors and Geometry of Space, Space coordinate and space vector	Vectors and Geometry of Space, Space coordinate and space vector	Vectors and Geometry of Space, Space coordinate and space vector
Fourth	4	Understand and apply the concepts of Scalar Product (Dot Product) and Applications (line equation in the plane).	Scalar Product (Dot Product) and Applications (line equation in the plane)	Scalar Product (Dot Product) and Applications (line equation in the plane)	Scalar Product (Dot Product) and Applications (line equation in the plane)
Fifth	4	Understand and apply the concepts of Cross Product (Vector Product) and Applications (the distance from appoint to a line in space).	Cross Product (Vector Product) and Applications (the distance from appoint to a line in space)	Cross Product (Vector Product) and Applications (the distance from appoint to a line in space)	Cross Product (Vector Product) and Applications (the distance from appoint to a line in space)
Sixth	4	Understand and apply the concepts of Plane Equation in space, Angles between planes.	Plane Equation in space, Angles between planes	Plane Equation in space, Angles between planes	Plane Equation in space, Angles between planes
Seventh	4	Understand and apply the concepts of Partial Differentiation, exercises.	Partial Differentiation, exercises	Partial Differentiation, exercises	Partial Differentiation, exercises
Eighth	4	Understand and apply the concepts of Second – Order Partial Differentiation, exercises.	Second – Order Partial Differentiation, exercises	Second – Order Partial Differentiation, exercises	Second – Order Partial Differentiation, exercises
Ninth	4	Understand and apply the concepts of The chain rule for partial derivatives.	The chain rule for partial derivatives	The chain rule for partial derivatives	The chain rule for partial derivatives
Tenth	4	Understand and apply the concepts of Directional Derivatives in the plane.	Directional Derivatives in the plane	Directional Derivatives in the plane	Directional Derivatives in the plane
Eleventh	4	Understand and apply the concepts of Tangent plane and normal line of surface.	Tangent plane and normal line of surface	Tangent plane and normal line of surface	Tangent plane and normal line of surface
Twelfth	4	Understand and apply the concepts of Extreme (Maxima and Minima) values and Saddle points..	Extreme (Maxima and Minima) values and Saddle points.	Extreme (Maxima and Minima) values and Saddle points.	Extreme (Maxima and Minima) values and Saddle points.
Thirteenth	4	Understand and apply the concepts of Double Integrals and its applications.	Double Integrals and its applications	Double Integrals and its applications	Double Integrals and its applications
Fourteenth	4	Understand and apply the concepts of The methods of least squares.	The methods of least squares	The methods of least squares	The methods of least squares
Fifteenth	4	Understand and apply the concepts of Infinite Sequences and Series.	Infinite Sequences and Series	Infinite Sequences and Series	Infinite Sequences and Series
Sixteenth	4	Assess students' understanding of the course topics.	Preparatory week before the final Exam	Preparatory week before the final Exam	Preparatory week before the final Exam

Course Evaluation
Quizzes: Formative assessment, time/number 3, weight 15% (15), week due 2, 6, 12, relevant learning outcome LO #1, 2, and 4. Assignments: Formative assessment, time/number 5, weight 15% (15), week due 1, 4, 7,11, 14, relevant learning outcome LO # 3, 4, 5, 6 and 7. Report: Formative assessment, time/number 1, weight 10% (10), week due 13, relevant learning outcome LO # 3 and 4. Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1-6. Final Exam: Summative assessment, time/number 2hr, weight 50% (50), week due 16, relevant learning outcome All. Total assessment: 100% (100 Marks).

Learning and Teaching Resources	
Required prescribed textbooks (methodological, if any)	"Calculus". Ross L Finney and George B. Thomas. Copyright by Addison Wesley Publishing Company, 1990.

Main references (sources)	“Calculus”. Ross L Finney and George B. Thomas. Copyright by Addison Wesley Publishing Company, 1990.
Recommended supporting books and references (scientific journals, reports, etc.)	“THOMAS CALCULUS” George B. Thomas. Printed in the United States of America., 2014.
Electronic references and websites	None

Course Description Form

Course Name:
Strength of Materials
Course Code:
DWRE-201
Semester / Academic Year: Annual
Second / 2025-2026
Date of Preparation of this Description
31/5/2026
Available Attendance Forms:
Total Study Hours / Total Units:
4
Course Coordinator Name (if more than one name is mentioned)
Abdullah Saeb Tais Jabr
Course Objectives

To develop problem solving skills and understanding of all types of forces. To understand the effect of forces on all types of materials. This course deals with the basic concept of simple stresses, shearing stresses, bearing stresses, statically indeterminate members, Torsion. Thin walled cylinders This is the basic subject for all forces and stresses. To understand Hooke law. Shear and moment in beams. Stresses in beams. Deflection in beams.	

Teaching and Learning Strategies	
Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.	

Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	4	Understand and apply the concepts of Introduction.	Introduction	Introduction	Introduction
Second	4	Understand and apply the concepts of Simple stresses.	Simple stresses	Simple stresses	Simple stresses
Third	4	Understand and apply the concepts of Shearing stresses.	Shearing stresses	Shearing stresses	Shearing stresses
Fourth	4	Understand and apply the concepts of bearing stresses.	bearing stresses	bearing stresses	bearing stresses
Fifth	4	Understand and apply the concepts of Statically indeterminate members.	Statically indeterminate members	Statically indeterminate members	Statically indeterminate members
Sixth	4	Understand and apply the concepts of Torsion.	Torsion	Torsion	Torsion
Seventh	4	Understand and apply the concepts of thin walled cylinders.	thin walled cylinders	thin walled cylinders	thin walled cylinders
Eighth	4	Understand and apply the concepts of Hooke law.	Hooke law	Hooke law	Hooke law
Ninth	4	Understand and apply the concepts of Poisson ratio.	Poisson ratio	Poisson ratio	Poisson ratio
Tenth	4	Understand and apply the concepts of Shear and moment in beams.	Shear and moment in beams	Shear and moment in beams	Shear and moment in beams
Eleventh	4	Understand and apply the concepts of Shear and moment in beams.	Shear and moment in beams	Shear and moment in beams	Shear and moment in beams
Twelfth	4	Understand and apply the concepts of Stresses in beams.	Stresses in beams	Stresses in beams	Stresses in beams
Thirteenth	4	Understand and apply the concepts of Stresses in beams.	Stresses in beams	Stresses in beams	Stresses in beams
Fourteenth	4	Understand and apply the concepts of Deformation in beams.	Deformation in beams	Deformation in beams	Deformation in beams
Fifteenth	4	Understand and apply the concepts of	Deformation in beams	Deformation in beams	Deformation in beams

		Deformation in beams.			
Sixteenth	4	Assess students' understanding of the course topics.	Preparatory week before the final Exam	Preparatory week before the final Exam	Preparatory week before the final Exam

Course Evaluation
Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, relevant learning outcome LO #1, 2, 10 and 11. Assignments: Formative assessment, time/number 2, weight 10% (10), week due 2, 12, relevant learning outcome LO # 3, 4, 6 and 7. Projects / Lab.: Formative assessment, time/number 1, weight 10% (10), week due Continuous, relevant learning outcome All. Report: Formative assessment, time/number 1, weight 10% (10), week due 13, relevant learning outcome LO # 5, 8 and 10. Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1-7. Final Exam: Summative assessment, time/number 2hr, weight 50% (50), week due 16, relevant learning outcome All. Total assessment: 100% (100 Marks).

Learning and Teaching Resources	
Required prescribed textbooks (methodological, if any)	Strength of Materials, Andrew Pytel&Ferdinand L Singer, 1980.
Main references (sources)	Strength of Materials, Andrew Pytel&Ferdinand L Singer, 1980.
Recommended supporting books and references (scientific journals, reports, etc.)	None
Electronic references and websites	None

Course Description Form

Course Name:
Fluid Mechanics 1
Course Code:
DWRE-202
Semester / Academic Year: Annual
Second / 2025-2026
Date of Preparation of this Description
31/5/2026
Available Attendance Forms:
Total Study Hours / Total Units:
6
Course Coordinator Name (if more than one name is mentioned)
Asmaa Abdul-Jabbar Jameel Mahdi

Course Objectives

The fluid mechanics is the basic subject for second-stage students in the dams and water resources engineering department that from this subject student will learn and practice to fluid properties (units and dimensions, Density, Specific weight. Viscosity, Surface tension, Capillarity. Fluid static (pressure–density–height relationships). Absolute pressure and gage pressure, types of pressure gages. Force on submerged plane surfaces. Force on submerged curved surfaces. Applied problem about gates, dams ……etc. Stability of submerged and floating bodies. This achieved by theoretical lecturers.

Teaching and Learning Strategies

Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	6	Understand and apply the concepts of Introduction.	Introduction	Introduction	Introduction
Second	6	Understand and apply the concepts of Fluid properties – Units and Dimensions, Density, Specific weight,.	Fluid properties – Units and Dimensions, Density, Specific weight,	Fluid properties – Units and Dimensions, Density, Specific weight,	Fluid properties – Units and Dimensions, Density, Specific weight,
Third	6	Understand and apply the concepts of Compressibility, Elasticity. Viscosity, Surface tension, Capillarity.	Compressibility, Elasticity. Viscosity, Surface tension, Capillarity	Compressibility, Elasticity. Viscosity, Surface tension, Capillarity	Compressibility, Elasticity. Viscosity, Surface tension, Capillarity
Fourth	6	Understand and apply the concepts of Fluid static (pressure–density–height relationships)..	Fluid static (pressure–density–height relationships).	Fluid static (pressure–density–height relationships).	Fluid static (pressure–density–height relationships).
Fifth	6	Understand and apply the concepts of Fluid static (pressure–density–height relationships)..	Fluid static (pressure–density–height relationships).	Fluid static (pressure–density–height relationships).	Fluid static (pressure–density–height relationships).
Sixth	6	Understand and apply the concepts of Absolute pressure and gage pressure,. types of pressure gages.	Absolute pressure and gage pressure,. types of pressure gages	Absolute pressure and gage pressure,. types of pressure gages	Absolute pressure and gage pressure,. types of pressure gages
Seventh	6	Understand and apply the concepts of Mid-term Exam.	Mid-term Exam	Mid-term Exam	Mid-term Exam
Eighth	6	Understand and apply the concepts of Force on submerged plane surfaces..	Force on submerged plane surfaces.	Force on submerged plane surfaces.	Force on submerged plane surfaces.
Ninth	6	Understand and apply the concepts of Force on submerged curved surfaces.	Force on submerged curved surfaces	Force on submerged curved surfaces	Force on submerged curved surfaces
Tenth	6	Understand and apply the concepts of Applied problem about gates,	Applied problem about gates, dams ……etc.	Applied problem about gates, dams ……etc.	Applied problem about gates, dams ……etc.

		dams ……etc..			
Eleventh	6	Understand and apply the concepts of Applied problem about gates, dams ……etc..	Applied problem about gates, dams ……etc.	Applied problem about gates, dams ……etc.	Applied problem about gates, dams ……etc.
Twelfth	6	Understand and apply the concepts of Stability of submerged and floating bodies..	Stability of submerged and floating bodies.	Stability of submerged and floating bodies.	Stability of submerged and floating bodies.
Thirteenth	6	Understand and apply the concepts of Applied problems on Stability of submerged and floating bodies.	Applied problems on Stability of submerged and floating bodies	Applied problems on Stability of submerged and floating bodies	Applied problems on Stability of submerged and floating bodies
Fourteenth	6	Understand and apply the concepts of Applied problems on Stability of submerged and floating bodies.	Applied problems on Stability of submerged and floating bodies	Applied problems on Stability of submerged and floating bodies	Applied problems on Stability of submerged and floating bodies
Fifteenth	6	Understand and apply the concepts of Applied problems on Stability of submerged and floating bodies.	Applied problems on Stability of submerged and floating bodies	Applied problems on Stability of submerged and floating bodies	Applied problems on Stability of submerged and floating bodies
Sixteenth	6	Assess students' understanding of the course topics.	Preparatory week before the final Exam	Preparatory week before the final Exam	Preparatory week before the final Exam

Course Evaluation
Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, relevant learning outcome LO #1, 2, 10 and 11. Assignments: Formative assessment, time/number 2, weight 10% (10), week due 2, 12, relevant learning outcome LO # 3, 4, 6 and 7. Projects / Lab.: Formative assessment, time/number 1, weight 10% (10), week due Continuous, relevant learning outcome All. Report: Formative assessment, time/number 1, weight 10% (10), week due 13, relevant learning outcome LO # 5, 8 and 10. Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1-7. Final Exam: Summative assessment, time/number 2hr, weight 50% (50), week due 16, relevant learning outcome All. Total assessment: 100% (100 Marks).

Learning and Teaching Resources	
Required prescribed textbooks (methodological, if any)	Elementary fluid mechanics By: Vinnard 6th ed. 1981
Main references (sources)	Elementary fluid mechanics By: Vinnard 6th ed. 1981
Recommended supporting books and references (scientific journals, reports, etc.)	fluid mechanics by MERLE C. POTTER, DAVID C. WIGGERT 2008
Electronic references and websites	https://www.coursera.org/browse/physical-science-and-engineering/fluid-mechanics

Course Description Form

Course Name:
Engineering Surveying I
Course Code:
DWRE-203
Semester / Academic Year: Annual
Second / 2025-2026
Date of Preparation of this Description
31/5/2026
Available Attendance Forms:
Total Study Hours / Total Units:
5
Course Coordinator Name (if more than one name is mentioned)
Ahmed Shihab Ahmed Mohammed Al-Jubouri
Course Objectives
Surveying I aims to teach students how to measure distances through obstacles, construction and adjustment of levels, Measurement a long straight line offset, Methods of locating a point or the types of coordinates, Systematic or accumulation errors for tape, Reciprocal leveling, Determine Contour Interval and Contour Line Values, determine the level of the sewer, and computation of area (regular and irregular figures) by using different methods.
Teaching and Learning Strategies
Learning and teaching strategies in surveying will be designed to engage students in the subject matter while equipping them with the necessary knowledge and skills. These will be encouraged students to participate in the learning process through activities that require them to apply their knowledge. This can be accomplished through problem-solving exercises, case studies, and fieldwork. Also, encourage students to work in groups to solve problems and complete projects. This approach promotes teamwork, communication, and critical thinking skills. Fieldwork will be Provided opportunities for students to engage in real-world surveying activities. This could involve conducting surveys, collecting data, and analyzing the results in the field.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	5	Understand and apply the concepts of Introduction - Surveying by tape.	Introduction - Surveying by tape	Introduction - Surveying by tape	Introduction - Surveying by tape
Second	5	Understand and apply the concepts of Methods of locating a point or the types of coordinates, Quiz No.1.	Methods of locating a point or the types of coordinates, Quiz No.1	Methods of locating a point or the types of coordinates, Quiz No.1	Methods of locating a point or the types of coordinates, Quiz No.1
Third	5	Understand and apply the concepts of Systematic or accumulation errors.	Systematic or accumulation errors	Systematic or accumulation errors	Systematic or accumulation errors
Fourth	5	Understand and apply the concepts of Systematic or accumulation errors: Correction for sag, Correction for pull or tension.	Systematic or accumulation errors: Correction for sag, Correction for pull or tension	Systematic or accumulation errors: Correction for sag, Correction for pull or tension	Systematic or accumulation errors: Correction for sag, Correction for pull or tension
Fifth	5	Understand and apply the concepts of Obstacles.	Obstacles	Obstacles	Obstacles
Sixth	5	Understand and apply the concepts of Levelling, Projection of building.	Levelling, Projection of building	Levelling, Projection of building	Levelling, Projection of building
Seventh	5	Understand and apply the concepts of Mid-term Exam.	Mid-term Exam	Mid-term Exam	Mid-term Exam
Eighth	5	Understand and apply the concepts of Procedure in levelling, Rise and fall method,.	Procedure in levelling, Rise and fall method,	Procedure in levelling, Rise and fall method,	Procedure in levelling, Rise and fall method,
Ninth	5	Understand and apply the concepts of Height of collimation method.	Height of collimation method	Height of collimation method	Height of collimation method
Tenth	5	Understand and apply the concepts of Cross-sections, Quiz No.2.	Cross-sections, Quiz No.2	Cross-sections, Quiz No.2	Cross-sections, Quiz No.2
Eleventh	5	Understand and apply the concepts of	contouring, Gridding or (The methods of squares), Radiating	contouring, Gridding or (The	contouring, Gridding or (The

		contouring, Gridding or (The methods of squares), Radiating lines, Direct contouring.	lines, Direct contouring	methods of squares), Radiating lines, Direct contouring	methods of squares), Radiating lines, Direct contouring
Twelfth	5	Understand and apply the concepts of Reciprocal leveling,.	Reciprocal leveling,	Reciprocal leveling,	Reciprocal leveling,
Thirteenth	5	Understand and apply the concepts of Curvature and Refraction, Sewer.	Curvature and Refraction, Sewer	Curvature and Refraction, Sewer	Curvature and Refraction, Sewer
Fourteenth	5	Understand and apply the concepts of Sewer.	Sewer	Sewer	Sewer
Fifteenth	5	Understand and apply the concepts of Areas , Mechanical integration – the planimeter, Areas enclosed by straight lines , and Irregular figures.	Areas , Mechanical integration – the planimeter, Areas enclosed by straight lines , and Irregular figures	Areas , Mechanical integration – the planimeter, Areas enclosed by straight lines , and Irregular figures	Areas , Mechanical integration – the planimeter, Areas enclosed by straight lines , and Irregular figures
Sixteenth	5	Assess students' understanding of the course topics.	Preparatory week before the final Exam	Preparatory week before the final Exam	Preparatory week before the final Exam

Course Evaluation
Quizzes: Formative assessment, time/number 2, weight 7.5% (7.5), week due 5, 10, relevant learning outcome LO #1, 2, 8,9 and 10. Assignments: Formative assessment, time/number 2, weight 7.5% (7.5), week due 2, 12, relevant learning outcome LO # 3, 4, 6 and 7. Projects / Lab.: Formative assessment, time/number 1, weight 15% (15), week due Continuous, relevant learning outcome All. Report: Formative assessment, time/number 7, weight 5% (5), week due 3,4,5,6,7,9,10, relevant learning outcome LO # 2, 3,4, 6,10 and 10. Midterm Exam: Summative assessment, time/number 2 hr, weight 15% (15), week due 7, relevant learning outcome LO # 1-7. Final Exam: Summative assessment, time/number 2hr, weight 50% (50), week due 16, relevant learning outcome All. Total assessment: 100% (100 Marks).

Learning and Teaching Resources	
Required prescribed textbooks (methodological, if any)	Surveying (A.Bannister & S.Raymond)
Main references (sources)	Surveying (A.Bannister & S.Raymond)
Recommended supporting books and references (scientific journals, reports, etc.)	Surveying by (S.K.Hussin and M.SNagaraj)
Electronic references and websites	None

Course Description Form

Course Name:
Concrete Technology
Course Code:
DWRE-204
Semester / Academic Year: Annual
Second / 2025-2026
Date of Preparation of this Description
31/5/2026
Available Attendance Forms:
Total Study Hours / Total Units:
4
Course Coordinator Name (if more than one name is mentioned)
Abdullah Saeb Tais Jabr
Course Objectives

1. Introduce students to cement components, manufacturing, types, and properties.
2. Study aggregates, their characteristics, sieve analysis, and laboratory tests.
3. Understand the properties of fresh concrete such as consistency, workability, segregation, and bleeding.
4. Study hardened concrete properties, curing, elasticity, shrinkage, creep, and durability.
5. Train students to design concrete mixes according to approved methods.

Teaching and Learning Strategies

The teaching and learning strategy in this course is based on theoretical lectures, classroom discussion, exercises, applied problems, homework assignments, and laboratory or field activities when available. This strategy aims to encourage student participation, develop critical thinking, link theory with practical application, and monitor learning through questions, quizzes, reports, and examinations.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	4	Understand and apply the concepts of Introduction to cement, cement production, and cement compounds.	Introduction to cement, cement production, and cement compounds	Lecture and discussion	Class questions and assignments
Second	4	Understand and apply the concepts of Cement hydration and volumes of hydration products.	Cement hydration and volumes of hydration products	Lecture and problem solving	Class questions and assignments
Third	4	Understand and apply the concepts of Types of cement and storage.	Types of cement and storage	Lecture and discussion	Class questions and assignments
Fourth	4	Understand and apply the concepts of Aggregates, their properties, and classification.	Aggregates, their properties, and classification	Lecture and problem solving	Class assignments
Fifth	4	Understand and apply the concepts of Sieve analysis, grading zones, and fineness modulus.	Sieve analysis, grading zones, and fineness modulus	Lecture and discussion	Class questions and assignments
Sixth	4	Understand and apply the concepts of Aggregate moisture, bulk density, and harmful substances in aggregates.	Aggregate moisture, bulk density, and harmful substances in aggregates	Lecture and problem solving	Class questions and assignments
Seventh	4	Understand and apply the concepts of Water used in concrete and admixtures.	Water used in concrete and admixtures	Lecture and discussion	Class questions and assignments
Eighth	4	Understand and apply the concepts of Fresh concrete: consistency, workability, and testing methods.	Fresh concrete: consistency, workability, and testing methods	Lecture and problem solving	Class assignments
Ninth	4	Understand and apply the concepts of Segregation and bleeding.	Segregation and bleeding	Lecture and discussion	Class questions and assignments
Tenth	4	Understand and apply the concepts of Mass concrete.	Mass concrete	Lecture and problem solving	Class questions and assignments
Eleventh	4	Understand and apply the concepts of Concrete	Concrete curing	Lecture and discussion	Class questions and assignments

		curing.			
Twelfth	4	Understand and apply the concepts of ACI method for concrete mix design.	ACI method for concrete mix design	Lecture and problem solving	Class assignments
Thirteenth	4	Understand and apply the concepts of British method for concrete mix design.	British method for concrete mix design	Lecture and discussion	Class questions and assignments
Fourteenth	4	Understand and apply the concepts of Elasticity, shrinkage, and creep.	Elasticity, shrinkage, and creep	Lecture and problem solving	Class questions and assignments
Fifteenth	4	Understand and apply the concepts of Concrete durability.	Concrete durability	Lecture and discussion	Class questions and assignments
Sixteenth	4	Assess students' understanding of the course topics.	Preparatory week before the final Exam	Lecture and problem solving	Final Exam

Course Evaluation
Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, 12, 14, relevant learning outcome LO #1, 2, 3, and 4. Assignments: Formative assessment, time/number 6, weight 18% (18), week due 2, 4, 6, 8, 10, 12, relevant learning outcome LO # 1, 2, 3, 4, 5 and 6. Reports: Formative assessment, time/number 3, weight 12% (12), week due Continuous. Midterm Exam: Summative assessment, time/number 2, weight 10% (10), week due 7, relevant learning outcome LO # 1-3. Final Exam: Summative assessment, time/number 3, weight 50% (50), week due 16, relevant learning outcome All. Total assessment: 100% (100 Marks).

Learning and Teaching Resources	
Required prescribed textbooks (methodological, if any)	Concrete Technology by A.M. Neville. Concrete Technology by M. Nouri. Khalaf & Hana Abed Yousif.
Main references (sources)	Concrete Technology by A.M. Neville. Concrete Technology by M. Nouri. Khalaf & Hana Abed Yousif.
Recommended supporting books and references (scientific journals, reports, etc.)	Properties of concrete by M.A. Orchard. Lea (2011) "The Chemistry of Cement and Concrete", Arnold. N.H. Taylor. (1965) " Concrete Technology and Practice ", Angus and Robertson. Building Research Establishment (1975)" Design of Normal Concrete Mixes. B.W. Shacklock (1974) “Concrete Constituents and Mix Proportions”, Cement and Concrete Associations.
Electronic references and websites	None

Course Description Form

Course Name:
The Crimes of the Baath Regime in Iraq
Course Code:
UOT005
Semester / Academic Year: Annual
Second / 2025-2026
Date of Preparation of this Description
31/5/2026
Available Attendance Forms:
Total Study Hours / Total Units:
2
Course Coordinator Name (if more than one name is mentioned)
Abdulrahman Zedan
Course Objectives

1. Introduce students to the nature of political regimes in Iraq and the violations of the Baath regime.
2. Explain the impact of Baath regime policies on rights, freedoms, and society.
3. Study the psychological, social, cultural, and media aspects of militarizing society.
4. Clarify environmental and humanitarian crimes such as draining the marshes and mass graves.
5. Strengthen national and legal awareness regarding the crimes of the former regime.

Teaching and Learning Strategies

The teaching and learning strategy in this course is based on theoretical lectures, classroom discussion, exercises, applied problems, homework assignments, and laboratory or field activities when available. This strategy aims to encourage student participation, develop critical thinking, link theory with practical application, and monitor learning through questions, quizzes, reports, and examinations.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	4	Understand and apply the concepts of Descriptive overview of political regimes in Iraq from 1921 to 2003.	Descriptive overview of political regimes in Iraq from 1921 to 2003	Lecture and discussion	Class questions and assignments
Second	4	Understand and apply the concepts of Violations of public rights and freedoms by the Baath regime.	Violations of public rights and freedoms by the Baath regime	Lecture and problem solving	Class questions and assignments
Third	4	Understand and apply the concepts of The most prominent decisions and laws issued by the Baath regime against Iraqi society.	The most prominent decisions and laws issued by the Baath regime against Iraqi society	Lecture and discussion	Class questions and assignments
Fourth	4	Understand and apply the concepts of Psychological and social crimes and the militarization of society.	Psychological and social crimes and the militarization of society	Lecture and problem solving	Class assignments
Fifth	4	Understand and apply the concepts of The Baath regime attitude toward religion and violations of Iraqi laws.	The Baath regime attitude toward religion and violations of Iraqi laws	Lecture and discussion	Class questions and assignments
Sixth	4	Understand and apply the concepts of The regime position on religious rituals.	The regime position on religious rituals	Lecture and problem solving	Class questions and assignments
Seventh	4	Understand and apply the concepts of Cultural and media violations by the Baath regime.	Cultural and media violations by the Baath regime	Lecture and discussion	Class questions and assignments
Eighth	4	Understand and apply the concepts of The policy of drying the marshes.	The policy of drying the marshes	Lecture and problem solving	Class assignments
Ninth	4	Understand and apply the concepts of Environmental pollution and minefields.	Environmental pollution and minefields	Lecture and discussion	Class questions and assignments
Tenth	4	Understand and apply the concepts of Bulldozing palm groves	Bulldozing palm groves and trees and the military destruction of cities and	Lecture and problem solving	Class questions and assignments

		and trees and the military destruction of cities and villages.	villages		
Eleventh	4	Understand and apply the concepts of Mass graves in Iraq.	Mass graves in Iraq	Lecture and discussion	Class questions and assignments
Twelfth	4	Understand and apply the concepts of Classification of mass graves in Iraq.	Classification of mass graves in Iraq	Lecture and problem solving	Class assignments
Thirteenth	4	Understand and apply the concepts of Chronological classification of mass graves in Iraq.	Chronological classification of mass graves in Iraq	Lecture and discussion	Class questions and assignments
Fourteenth	4	Understand and apply the concepts of The crime of the Halabja chemical attack.	The crime of the Halabja chemical attack	Lecture and problem solving	Class questions and assignments
Fifteenth	4	Understand and apply the concepts of Crimes of genocide and the issue of missing persons.	Crimes of genocide and the issue of missing persons	Lecture and discussion	Class questions and assignments
Sixteenth	4	Assess students' understanding of the course topics.	Preparatory week before the final Exam	Lecture and problem solving	Final Exam

Course Evaluation
Quizzes: Formative assessment, time/number 4, weight 20% (20), week due 3, 5, 7,, ,9,11,13, relevant learning outcome LO #1, 2,3,4....., ,11. Assignments (Homeworks): Formative assessment, time/number 6, weight 15% (15), week due 2, 4, 6, 10,12,14, relevant learning outcome LO # 1, 2, 3, 4 .....,,11. Discussions: Formative assessment, time/number 7, weight 5% (5), week due Continuous. Midterm Exam: Summative assessment, time/number 2, weight 10% (10), week due 8, relevant learning outcome LO # 1-7. Final Exam: Summative assessment, time/number 3, weight 50% (50), week due 16, relevant learning outcome All. Total assessment: 100% (100 Marks).

Learning and Teaching Resources	
Required prescribed textbooks (methodological, if any)	Official curriculum approved by the Ministry
Main references (sources)	Official curriculum approved by the Ministry
Recommended supporting books and references (scientific journals, reports, etc.)	None
Electronic references and websites	N/A

Course Description Form

Course Name:
Arabic Language II
Course Code:
UOT-011
Semester / Academic Year: Annual
Second / 2025-2026
Date of Preparation of this Description
31/5/2026
Available Attendance Forms:
Total Study Hours / Total Units:
2
Course Coordinator Name (if more than one name is mentioned)
Wasen Younis
Course Objectives

1. Develop students' ability to read, understand, and analyze Arabic texts.
2. Introduce selected examples from poetry and Quranic texts.
3. Reinforce the basic rules of grammar and spelling.
4. Train students to use Arabic correctly in writing and expression.
5. Address common mistakes such as solar and lunar letters and the use of Dad and Dha.

Teaching and Learning Strategies

The teaching and learning strategy in this course is based on theoretical lectures, classroom discussion, exercises, applied problems, homework assignments, and laboratory or field activities when available. This strategy aims to encourage student participation, develop critical thinking, link theory with practical application, and monitor learning through questions, quizzes, reports, and examinations.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	4	Understand and apply the concepts of Marouf Al-Rusafi.	Marouf Al-Rusafi	Lecture and discussion	Class questions and assignments
Second	4	Understand and apply the concepts of Imam Al-Shafi'i.	Imam Al-Shafi'i	Lecture and problem solving	Class questions and assignments
Third	4	Understand and apply the concepts of From the Holy Qur'an: Surat Yusuf.	From the Holy Qur'an: Surat Yusuf	Lecture and discussion	Class questions and assignments
Fourth	4	Understand and apply the concepts of The poet Badr Shakir Al-Sayyab.	The poet Badr Shakir Al-Sayyab	Lecture and problem solving	Class assignments
Fifth	4	Understand and apply the concepts of Noon and Tanween.	Noon and Tanween	Lecture and discussion	Class questions and assignments
Sixth	4	Understand and apply the concepts of Imam Ali ibn Abi Talib (peace be upon him).	Imam Ali ibn Abi Talib (peace be upon him)	Lecture and problem solving	Class questions and assignments
Seventh	4	Understand and apply the concepts of Al-Jawahiri.	Al-Jawahiri	Lecture and discussion	Class questions and assignments
Eighth	4	Understand and apply the concepts of The Hamza.	The Hamza	Lecture and problem solving	Class assignments
Ninth	4	Understand and apply the concepts of Noun, verb, and letter.	Noun, verb, and letter	Lecture and discussion	Class questions and assignments
Tenth	4	Understand and apply the concepts of The poem of Al-Farazdaq.	The poem of Al-Farazdaq	Lecture and problem solving	Class questions and assignments
Eleventh	4	Understand and apply the concepts of The solar and lunar Lam.	The solar and lunar Lam	Lecture and discussion	Class questions and assignments
Twelfth	4	Understand and apply the concepts of Al-Mutanabbi.	Al-Mutanabbi	Lecture and problem solving	Class assignments
Thirteenth	4	Understand and apply the concepts of Common mistakes.	Common mistakes	Lecture and discussion	Class questions and assignments
Fourteenth	4	Understand and apply the concepts of Al-Ma'arri.	Al-Ma'arri	Lecture and problem solving	Class questions and assignments
Fifteenth	4	Understand and apply the concepts of The letters Dad and Dha.	The letters Dad and Dha	Lecture and discussion	Class questions and assignments

Sixteenth	4	Assess students' understanding of the course topics.	Preparatory week before the final Exam	Lecture and problem solving	Final Exam

Course Evaluation
Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 3, 5, 7,, ,9,11,13, relevant learning outcome LO #1,2,3,4,5,6,7. Assignments (Homeworks): Formative assessment, time/number 3, weight 15% (15), week due 2, 4, 6, 10,12,14, relevant learning outcome LO # 1,2,3,4,5,6,7. Home works: Formative assessment, time/number 2, weight 6% (6), week due Continuous, relevant learning outcome 1,2,3,4. Seminars: Formative assessment, time/number 3, weight 9% (9), week due Continuous, relevant learning outcome 2,4. Midterm Exam: Summative assessment, time/number 2, weight 10% (10), week due 8, relevant learning outcome LO # 1-7. Final Exam: Summative assessment, time/number 3, weight 50% (50), week due 16, relevant learning outcome All. Total assessment: 100% (100 Marks).

Learning and Teaching Resources	
Required prescribed textbooks (methodological, if any)	Arabic Language for Non-Specialist Departments
Main references (sources)	Arabic Language for Non-Specialist Departments
Recommended supporting books and references (scientific journals, reports, etc.)	Al-Tafsir Al-Wasit, Prof. Dr. Wahbah Al-Zuhayli Al-Minhaj in Grammar and Parsing, Muhammad Al-Antaki
Electronic references and websites	N/A

Course Description Form

Course Name:
Calculus IV
Course Code:
MATH-202
Semester / Academic Year: Annual
Second / 2025-2026
Date of Preparation of this Description
31/5/2026
Available Attendance Forms:
Total Study Hours / Total Units:
4
Course Coordinator Name (if more than one name is mentioned)
Firas Hazem Jasim Mohammed
Course Objectives

To develop problem solving skills and understanding of Polar coordinates system and its applications. To understand Vectors and Geometry of Space, Scalar Product, Cross Product This course deals with the basic concept of Partial Differentiation. To understand Double Integrals and its applications. To perform Infinite Sequences and Series analysis.	

Teaching and Learning Strategies

The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of exercises involving some problems that are interesting to the students in mathematics scope.	

Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	4	Understand and apply the concepts of Introduction to Functions of Several Variables.	Introduction to Functions of Several Variables	Introduction to Functions of Several Variables	Introduction to Functions of Several Variables
Second	4	Understand and apply the concepts of Partial Differentiation (Part I).	Partial Differentiation (Part I)	Partial Differentiation (Part I)	Partial Differentiation (Part I)
Third	4	Understand and apply the concepts of Partial Differentiation (Part II) — Exercises.	Partial Differentiation (Part II) — Exercises	Partial Differentiation (Part II) — Exercises	Partial Differentiation (Part II) — Exercises
Fourth	4	Understand and apply the concepts of Second-Order Partial Differentiation (Part I).	Second-Order Partial Differentiation (Part I)	Second-Order Partial Differentiation (Part I)	Second-Order Partial Differentiation (Part I)
Fifth	4	Understand and apply the concepts of Second-Order Partial Differentiation (Part II) — Exercises.	Second-Order Partial Differentiation (Part II) — Exercises	Second-Order Partial Differentiation (Part II) — Exercises	Second-Order Partial Differentiation (Part II) — Exercises
Sixth	4	Understand and apply the concepts of The Chain Rule for Partial Derivatives.	The Chain Rule for Partial Derivatives	The Chain Rule for Partial Derivatives	The Chain Rule for Partial Derivatives
Seventh	4	Understand and apply the concepts of Directional Derivatives and the Gradient Vector.	Directional Derivatives and the Gradient Vector	Directional Derivatives and the Gradient Vector	Directional Derivatives and the Gradient Vector
Eighth	4	Understand and apply the concepts of Tangent Plane and Normal Line to a Surface.	Tangent Plane and Normal Line to a Surface	Tangent Plane and Normal Line to a Surface	Tangent Plane and Normal Line to a Surface
Ninth	4	Understand and apply the concepts of Extreme (Maxima and Minima) Values (Part I).	Extreme (Maxima and Minima) Values (Part I)	Extreme (Maxima and Minima) Values (Part I)	Extreme (Maxima and Minima) Values (Part I)
Tenth	4	Understand and apply the concepts of Extreme Values (Part II) and Saddle Points.	Extreme Values (Part II) and Saddle Points	Extreme Values (Part II) and Saddle Points	Extreme Values (Part II) and Saddle Points
Eleventh	4	Understand and apply the concepts of Double Integrals (Part I).	Double Integrals (Part I)	Double Integrals (Part I)	Double Integrals (Part I)
Twelfth	4	Understand and apply the concepts of Double Integrals (Part II) —	Double Integrals (Part II) — Applications	Double Integrals (Part II) — Applications	Double Integrals (Part II) — Applications

		Applications.			
Thirteenth	4	Understand and apply the concepts of The Method of Least Squares (Part I).	The Method of Least Squares (Part I)	The Method of Least Squares (Part I)	The Method of Least Squares (Part I)
Fourteenth	4	Understand and apply the concepts of The Method of Least Squares (Part II) and Infinite Sequences.	The Method of Least Squares (Part II) and Infinite Sequences	The Method of Least Squares (Part II) and Infinite Sequences	The Method of Least Squares (Part II) and Infinite Sequences
Fifteenth	4	Understand and apply the concepts of Applications.	Applications	Applications	Applications
Sixteenth					
Course Evaluation					
Quizzes: Formative assessment, time/number 3, weight 15% (15), week due 2, 6, 12, relevant learning outcome LO #1, 2, and 4. Assignments: Formative assessment, time/number 5, weight 15% (15), week due 1, 4, 7,11, 14, relevant learning outcome LO # 3, 4, 5, 6 and 7. Report: Formative assessment, time/number 1, weight 10% (10), week due 13, relevant learning outcome LO # 3 and 4. Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1-6. Final Exam: Summative assessment, time/number 2hr, weight 50% (50), week due 16, relevant learning outcome All. Total assessment: 100% (100 Marks).					
Learning and Teaching Resources			Learning and Teaching Resources		
Required prescribed textbooks (methodological, if any)			“Calculus”. Ross L Finney and George B. Thomas. Copyright by Addison Wesley Publishing Company, 1990.		
Main references (sources)			“Calculus”. Ross L Finney and George B. Thomas. Copyright by Addison Wesley Publishing Company, 1990.		
Recommended supporting books and references (scientific journals, reports, etc.)			“THOMAS CALCULUS” George B. Thomas. Printed in the United States of America., 2014.		

Course Description Form

Course Name:
Fluid Mechanics II
Course Code:
DWRE-205
Semester / Academic Year: Annual
Second / 2025-2026
Date of Preparation of this Description
31/5/2026
Available Attendance Forms:
Total Study Hours / Total Units:
6
Course Coordinator Name (if more than one name is mentioned)
Mohammed Faeq Yas Khudair
Course Objectives
The fluid mechanics is the basic subject for second-stage students in the dams and water resources engineering department that from this subject student will learn and practice to velocity and acceleration of water flow. Conservation of mass: the continuity equation. One two three-dimensional flow, steady and unsteady flow. One dimensional flow Euler's equation, Bernoulli's equation determination and Application of Bernoulli's equation (Venturi meter, orifice and sluice gate). Momentum equation determination and application.
Teaching and Learning Strategies
Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	6	Understand and apply the concepts of Introduction.	Introduction	Introduction	Introduction
Second	6	Understand and apply the concepts of Fluid kinematics.	Fluid kinematics	Fluid kinematics	Fluid kinematics
Third	6	Understand and apply the concepts of Types of fluid flow.	Types of fluid flow	Types of fluid flow	Types of fluid flow
Fourth	6	Understand and apply the concepts of Types of flow lines.	Types of flow lines	Types of flow lines	Types of flow lines
Fifth	6	Understand and apply the concepts of Conservation of mass continuity equation.	Conservation of mass continuity equation	Conservation of mass continuity equation	Conservation of mass continuity equation
Sixth	6	Understand and apply the concepts of Continuity equation.	Continuity equation	Continuity equation	Continuity equation
Seventh	6	Understand and apply the concepts of Mid-term Exam.	Mid-term Exam	Mid-term Exam	Mid-term Exam
Eighth	6	Understand and apply the concepts of Types of head or energy of a flow in motion.	Types of head or energy of a flow in motion	Types of head or energy of a flow in motion	Types of head or energy of a flow in motion
Ninth	6	Understand and apply the concepts of Bernoulli's equation.	Bernoulli's equation	Bernoulli's equation	Bernoulli's equation
Tenth	6	Understand and apply the concepts of Application of Bernoulli's equation.	Application of Bernoulli's equation	Application of Bernoulli's equation	Application of Bernoulli's equation
Eleventh	6	Understand and apply the concepts of Tutorials and problem solve.	Tutorials and problem solve	Tutorials and problem solve	Tutorials and problem solve
Twelfth	6	Understand and apply the concepts of Pumps in the Bernoulli Equation.	Pumps in the Bernoulli Equation	Pumps in the Bernoulli Equation	Pumps in the Bernoulli Equation
Thirteenth	6	Understand and apply the concepts of The impulse-momentum equation.	The impulse-momentum equation	The impulse-momentum equation	The impulse-momentum equation
Fourteenth	6	Understand and apply the concepts of Applied	Applied problems on Bernoulli's equation	Applied problems on Bernoulli's	Applied problems on Bernoulli's

		problems on Bernoulli's equation.		equation	equation
Fifteenth	6	Understand and apply the concepts of Applied problems on Pumps in the Bernoulli Equation and momentum.	Applied problems on Pumps in the Bernoulli Equation and momentum	Applied problems on Pumps in the Bernoulli Equation and momentum	Applied problems on Pumps in the Bernoulli Equation and momentum
Sixteenth	6	Assess students' understanding of the course topics.	Preparatory week before the final Exam	Preparatory week before the final Exam	Preparatory week before the final Exam

Course Evaluation
Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, relevant learning outcome LO #1, 2, 10 and 11. Assignments: Formative assessment, time/number 2, weight 10% (10), week due 2, 12, relevant learning outcome LO # 3, 4, 6 and 7. Projects / Lab.: Formative assessment, time/number 1, weight 10% (10), week due Continuous, relevant learning outcome All. Report: Formative assessment, time/number 1, weight 10% (10), week due 13, relevant learning outcome LO # 5, 8 and 10. Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1-7. Final Exam: Summative assessment, time/number 2hr, weight 50% (50), week due 16, relevant learning outcome All. Total assessment: 100% (100 Marks).

Learning and Teaching Resources	
Required prescribed textbooks (methodological, if any)	Elementary fluid mechanics By: Vinnard 6th ed. 1981
Main references (sources)	Elementary fluid mechanics By: Vinnard 6th ed. 1981
Recommended supporting books and references (scientific journals, reports, etc.)	fluid mechanics by MERLE C. POTTER, DAVID C. WIGGERT 2008
Electronic references and websites	https://www.coursera.org/browse/physical-science-and-engineering/fluid-mechanics

Course Description Form

Course Name:
Engineering Surveying II
Course Code:
DWRE-206
Semester / Academic Year: Annual
Second / 2025-2026
Date of Preparation of this Description
31/5/2026
Available Attendance Forms:
Total Study Hours / Total Units:
5
Course Coordinator Name (if more than one name is mentioned)
Aynur Najat Ameen Khorsheed
Course Objectives

Surveying II aims to teach students how to calculate the earthworks and reservoir volumes from contour maps, bearing of lines, designation of bearing, theodolite, construction and adjustment of the theodolite, measurement of angles, traverse surveys and their adjustment, tachometer, and total station.

Teaching and Learning Strategies

Learning and teaching strategies in surveying will be designed to engage students in the subject matter while equipping them with the necessary knowledge and skills. These will be encouraged students to participate in the learning process through activities that require them to apply their knowledge. This can be accomplished through problem-solving exercises, case studies, and fieldwork. Also, encourage students to work in groups to solve problems and complete projects. This approach promotes teamwork, communication, and critical thinking skills. Fieldwork will be Provided opportunities for students to engage in real-world surveying activities. This could involve conducting surveys, collecting data, and analyzing the results in the field.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	5	Understand and apply the concepts of Introduction, Irregular figures, Give and take lines, Counting squares..	Introduction, Irregular figures, Give and take lines, Counting squares.	Introduction, Irregular figures, Give and take lines, Counting squares.	Introduction, Irregular figures, Give and take lines, Counting squares.
Second	5	Understand and apply the concepts of Counting squares, Trapezoidal Rule, Simpson Rule (for odd number),Quiz No.1.	Counting squares, Trapezoidal Rule, Simpson Rule (for odd number),Quiz No.1	Counting squares, Trapezoidal Rule, Simpson Rule (for odd number),Quiz No.1	Counting squares, Trapezoidal Rule, Simpson Rule (for odd number),Quiz No.1
Third	5	Understand and apply the concepts of Volumes Earthwork calculation, Volumes from cross-sections, Sections level a cross (one level section), Sections with a cross fall (two level section)..	Volumes Earthwork calculation, Volumes from cross-sections, Sections level a cross (one level section), Sections with a cross fall (two level section).	Volumes Earthwork calculation, Volumes from cross-sections, Sections level a cross (one level section), Sections with a cross fall (two level section).	Volumes Earthwork calculation, Volumes from cross-sections, Sections level a cross (one level section), Sections with a cross fall (two level section).
Fourth	5	Understand and apply the concepts of Sections part in cut and part in fill, Section of variable levels (three level section), Multi-level section.	Sections part in cut and part in fill, Section of variable levels (three level section), Multi-level section	Sections part in cut and part in fill, Section of variable levels (three level section), Multi-level section	Sections part in cut and part in fill, Section of variable levels (three level section), Multi-level section
Fifth	5	Understand and apply the concepts of Computation of volumes, mean areas, end areas, Prismoidal formula..	Computation of volumes, mean areas, end areas, Prismoidal formula.	Computation of volumes, mean areas, end areas, Prismoidal formula.	Computation of volumes, mean areas, end areas, Prismoidal formula.
Sixth	5	Understand and apply the concepts of The volume of a pyramid, The Volume of wedge..	The volume of a pyramid, The Volume of wedge.	The volume of a pyramid, The Volume of wedge.	The volume of a pyramid, The Volume of wedge.
Seventh	5	Understand and apply the concepts of Simpson's Rule for Volumes, Volumes from	Simpson's Rule for Volumes, Volumes from spot levels or (volume of Borrow), Volume from contour lines	Simpson's Rule for Volumes, Volumes from spot levels or	Simpson's Rule for Volumes, Volumes from spot levels or (volume of

		spot levels or (volume of Borrow), Volume from contour lines.		(volume of Borrow), Volume from contour lines	Borrow), Volume from contour lines
Eighth	5	Understand and apply the concepts of Mid-term Exam, Bearing, Designation of Bearings,.	Mid-term Exam, Bearing, Designation of Bearings,	Mid-term Exam, Bearing, Designation of Bearings,	Mid-term Exam, Bearing, Designation of Bearings,
Ninth	5	Understand and apply the concepts of Deflection angle, Fore and Back Bearings. Calculation of bearings from angles,.	Deflection angle, Fore and Back Bearings. Calculation of bearings from angles,	Deflection angle, Fore and Back Bearings. Calculation of bearings from angles,	Deflection angle, Fore and Back Bearings. Calculation of bearings from angles,
Tenth	5	Understand and apply the concepts of Calculation of deflection angles from included angles, Quiz No.2.	Calculation of deflection angles from included angles, Quiz No.2	Calculation of deflection angles from included angles, Quiz No.2	Calculation of deflection angles from included angles, Quiz No.2
Eleventh	5	Understand and apply the concepts of The theodolite and traverse surveying, Traverse computations, Latitudes and departure..	The theodolite and traverse surveying, Traverse computations, Latitudes and departure.	The theodolite and traverse surveying, Traverse computations, Latitudes and departure.	The theodolite and traverse surveying, Traverse computations, Latitudes and departure.
Twelfth	5	Understand and apply the concepts of Closing error, Graphical adjustment, bowditch's rule, Transit rule, Distribution of the angular error.	Closing error, Graphical adjustment, bowditch's rule, Transit rule, Distribution of the angular error	Closing error, Graphical adjustment, bowditch's rule, Transit rule, Distribution of the angular error	Closing error, Graphical adjustment, bowditch's rule, Transit rule, Distribution of the angular error
Thirteenth	5	Understand and apply the concepts of Tachometry, Optical principles, Determine the stadia interval factor.	Tachometry, Optical principles, Determine the stadia interval factor	Tachometry, Optical principles, Determine the stadia interval factor	Tachometry, Optical principles, Determine the stadia interval factor
Fourteenth	5	Understand and apply the concepts of Tachometry, Optical principles , Total station.	Tachometry, Optical principles , Total station	Tachometry, Optical principles , Total station	Tachometry, Optical principles , Total station
Fifteenth	5	Understand and apply the concepts of Total station.	Total station	Total station	Total station
Sixteenth	5	Assess students' understanding of the course topics.	Preparatory week before the final Exam	Preparatory week before the final Exam	Preparatory week before the final Exam

Course Evaluation
Quizzes: Formative assessment, time/number 2, weight 7.5% (7.5), week due 5, 10, relevant learning outcome LO #1, 2, 8,9 and 10. Assignments: Formative assessment, time/number 2, weight 7.5% (7.5), week due 2, 12, relevant learning outcome LO # 3, 4, 6 and 7. Projects / Lab.: Formative assessment, time/number 1, weight 15% (15), week due Continuous, relevant learning outcome All. Report: Formative assessment, time/number 7, weight 5% (5), week due 3,4,5,6,7,9,10, relevant learning outcome LO # 2, 3,4, 6,10 and 10. Midterm Exam: Summative assessment, time/number 2 hr, weight 15% (15), week due 8, relevant learning outcome LO # 1-8. Final Exam: Summative assessment, time/number 2hr, weight 50% (50), week due 16, relevant learning outcome All. Total assessment: 100% (100 Marks).

Learning and Teaching Resources	
Required prescribed textbooks (methodological, if any)	Surveying (A.Bannister & S.Raymond)
Main references (sources)	Surveying (A.Bannister & S.Raymond)
Recommended supporting books and references (scientific journals, reports, etc.)	Surveying by (S.K.Hussin and M.SNagaraj)
Electronic references and websites	None

Course Description Form

Course Name:
Water Quality and Pollution
Course Code:
DWRE-207
Semester / Academic Year: Annual
Second / 2025-2026
Date of Preparation of this Description
31/5/2026
Available Attendance Forms:
Total Study Hours / Total Units:
5
Course Coordinator Name (if more than one name is mentioned)
Wissam Sameer Mohammed Ali
Course Objectives

The aims of this topic

1. To gain an understanding of the environment and the different types of environmental pollution.
2. To understand the quantitative and qualitative distribution of water in the world and the hydrological cycle of water from a quantity perspective.
3. To learn about the properties of water sources and how they can become polluted.
4. To understand the impact of engineering projects on water quality and self-purification.
5. To study the effect of decomposition rate (decomposition constant) on the amount of oxygen required in the process of waste decomposition.
6. To analyze the effect of the quality and quantity of wastewater entering and leaving a lake.
7. To study the deficit of oxygen in the water and the processes of reaeration and deoxygenation.
8. To investigate the effect of wastewater on rivers and the different types of pollution that can occur.
9. To understand the impact of detergents on water pollution.
10. To study the different types of pollution that can affect rivers and their ecosystems.

Teaching and Learning Strategies

To ensure effective learning of water quality and pollution, the teaching strategies employed should be engaging and equip students with the relevant knowledge and skills. This can be achieved through problem-solving exercises, case studies, and fieldwork. Collaborative learning in groups promotes teamwork, communication, and critical thinking skills. Regular feedback and reflection help students identify areas for improvement and consolidate their learning. Case studies are also useful in illustrating the impact of water pollution on different environments and ecosystems and emphasize the importance of protecting water resources. By utilizing these strategies, students can gain a deeper understanding of water quality and pollution, and develop the skills necessary to become effective professionals in this field.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	5	Understand and apply the concepts of Introduction to Environment.	Introduction to Environment	Introduction to Environment	Introduction to Environment
Second	5	Understand and apply the concepts of Hydrological Cycle of water from quantity sides. Quiz No.1.	Hydrological Cycle of water from quantity sides. Quiz No.1	Hydrological Cycle of water from quantity sides. Quiz No.1	Hydrological Cycle of water from quantity sides. Quiz No.1
Third	5	Understand and apply the concepts of Properties of water sources, how water sources polluted..	Properties of water sources, how water sources polluted.	Properties of water sources, how water sources polluted.	Properties of water sources, how water sources polluted.
Fourth	5	Understand and apply the concepts of Effect of engineering project on water quality and self-purification..	Effect of engineering project on water quality and self-purification.	Effect of engineering project on water quality and self-purification.	Effect of engineering project on water quality and self-purification.
Fifth	5	Understand and apply the concepts of Effect of decomposition rate (decomposition constant) on the amount of oxygen required in the process of waste decomposition.	Effect of decomposition rate (decomposition constant) on the amount of oxygen required in the process of waste decomposition	Effect of decomposition rate (decomposition constant) on the amount of oxygen required	Effect of decomposition rate (decomposition constant) on the amount of oxygen required in the process of waste

				in the process of waste decomposition	decomposition
Sixth	5	Understand and apply the concepts of Effect of decomposition rate (decomposition constant) on the amount of oxygen required in the process of waste decomposition.	Effect of decomposition rate (decomposition constant) on the amount of oxygen required in the process of waste decomposition	Effect of decomposition rate (decomposition constant) on the amount of oxygen required in the process of waste decomposition	Effect of decomposition rate (decomposition constant) on the amount of oxygen required in the process of waste decomposition
Seventh	5	Understand and apply the concepts of Calculate the change of dissolved oxygen along the riverbed due to wastewater..	Calculate the change of dissolved oxygen along the riverbed due to wastewater.	Calculate the change of dissolved oxygen along the riverbed due to wastewater.	Calculate the change of dissolved oxygen along the riverbed due to wastewater.
Eighth	5	Understand and apply the concepts of Mid-term Exam.	Mid-term Exam	Mid-term Exam	Mid-term Exam
Ninth	5	Understand and apply the concepts of Calculate the change of deficit oxygen along the riverbed due to wastewater..	Calculate the change of deficit oxygen along the riverbed due to wastewater.	Calculate the change of deficit oxygen along the riverbed due to wastewater.	Calculate the change of deficit oxygen along the riverbed due to wastewater.
Tenth	5	Understand and apply the concepts of Calculate the change of BoD along the riverbed due to wastewater, Quiz No.2.	Calculate the change of BoD along the riverbed due to wastewater, Quiz No.2	Calculate the change of BoD along the riverbed due to wastewater, Quiz No.2	Calculate the change of BoD along the riverbed due to wastewater, Quiz No.2
Eleventh	5	Understand and apply the concepts of Effect of the quality and quantity of wastewater entering and leaving the lake..	Effect of the quality and quantity of wastewater entering and leaving the lake.	Effect of the quality and quantity of wastewater entering and leaving the lake.	Effect of the quality and quantity of wastewater entering and leaving the lake.
Twelfth	5	Understand and apply the concepts of Effect of the quality and quantity of wastewater entering and leaving the lake..	Effect of the quality and quantity of wastewater entering and leaving the lake.	Effect of the quality and quantity of wastewater entering and leaving the lake.	Effect of the quality and quantity of wastewater entering and leaving the lake.
Thirteenth	5	Understand and apply the concepts of Seasonal inversion in lakes, Effect of detergents on the pollution of the water.	Seasonal inversion in lakes, Effect of detergents on the pollution of the water	Seasonal inversion in lakes, Effect of detergents on the pollution of the water	Seasonal inversion in lakes, Effect of detergents on the pollution of the water
Fourteenth	5	Understand and apply the concepts of Study the type of pollution on the river..	Study the type of pollution on the river.	Study the type of pollution on the river.	Study the type of pollution on the river.
Fifteenth	5	Understand and apply the concepts of Wastewater treatment..	Wastewater treatment.	Wastewater treatment.	Wastewater treatment.
Sixteenth	5	Assess students' understanding of the course topics.	Preparatory week before the final Exam	Preparatory week before the final Exam	Preparatory week before the final Exam

Course Evaluation
Quizzes: Formative assessment, time/number 2, weight 7.5% (7.5), week due 5, 10, relevant learning outcome LO #1, 2, 8,9 and 10. Assignments: Formative assessment, time/number 2, weight 7.5% (7.5), week due 2, 12, relevant learning outcome LO # 3, 4, 6 and 7. Projects / Lab.: Formative assessment, time/number 1, weight 15% (15), week due Continuous, relevant learning outcome All. Report: Formative assessment, time/number 5, weight 5% (5), week due 3,4,5,6,7,9, relevant learning outcome LO # 2, 3,4, 6,10 and 10. Midterm Exam: Summative assessment, time/number 2 hr, weight 15% (15), week due 8, relevant learning outcome LO # 1-8. Final Exam: Summative assessment, time/number 2hr, weight 50% (50), week due 16, relevant learning outcome All. Total assessment: 100% (100 Marks).

Learning and Teaching Resources	
Required prescribed textbooks (methodological, if any)	Dr. Tariq Ahmad Mahmood, "Environmental Science and Technology", a methodological textbook for Environmental Engineering, University of Mosul, College of Engineering.
Main references (sources)	Dr. Tariq Ahmad Mahmood, "Environmental Science and Technology", a methodological textbook for Environmental Engineering, University of Mosul, College of Engineering.
Recommended supporting books and references (scientific journals, reports, etc.)	None
Electronic references and websites	None

Course Description Form

Course Name:
Engineering Geology
Course Code:
DWRE-208
Semester / Academic Year: Annual
Second / 2025-2026
Date of Preparation of this Description
31/5/2026
Available Attendance Forms:
Total Study Hours / Total Units:
4
Course Coordinator Name (if more than one name is mentioned)
Lamyaa Najah Sunoudi
Course Objectives

Teaching and Learning Strategies	
The teaching and learning strategy in this course is based on theoretical lectures, classroom discussion, exercises, applied problems, homework assignments, and laboratory or field activities when available. This strategy aims to encourage student participation, develop critical thinking, link theory with practical application, and monitor learning through questions, quizzes, reports, and examinations.	

Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	4	Understand and apply the concepts of Definitions of the Earth and its components.	Definitions of the Earth and its components	Lecture and discussion	Class questions and assignments
Second	4	Understand and apply the concepts of Geological history and drilling.	Geological history and drilling	Lecture and problem solving	Class questions and assignments
Third	4	Understand and apply the concepts of Weathering and soil formation.	Weathering and soil formation	Lecture and discussion	Class questions and assignments
Fourth	4	Understand and apply the concepts of Properties of sedimentary rocks.	Properties of sedimentary rocks	Lecture and problem solving	Class assignments
Fifth	4	Understand and apply the concepts of Properties of igneous and metamorphic rocks.	Properties of igneous and metamorphic rocks	Lecture and discussion	Class questions and assignments
Sixth	4	Understand and apply the concepts of Minerals.	Minerals	Lecture and problem solving	Class questions and assignments
Seventh	4	Understand and apply the concepts of Crystals and gemstones.	Crystals and gemstones	Lecture and discussion	Class questions and assignments
Eighth	4	Understand and apply the concepts of Topographic and geological maps.	Topographic and geological maps	Lecture and problem solving	Class assignments
Ninth	4	Understand and apply the concepts of Environmental geology: pollution, desertification, and drought.	Environmental geology: pollution, desertification, and drought	Lecture and discussion	Class questions and assignments
Tenth	4	Understand and apply the concepts of Engineering geology: dams, tunnels, roads, and bridges.	Engineering geology: dams, tunnels, roads, and bridges	Lecture and problem solving	Class questions and assignments
Eleventh	4	Understand and apply the concepts of Rock and soil mechanics and geophysical methods.	Rock and soil mechanics and geophysical methods	Lecture and discussion	Class questions and assignments
Twelfth	4	Understand and apply the concepts of Sand dunes and special soils.	Sand dunes and special soils	Lecture and problem solving	Class assignments
Thirteenth	4	Understand and apply the concepts of Soil investigations and site selection.	Soil investigations and site selection	Lecture and discussion	Class questions and assignments

Fourteenth	4	Understand and apply the concepts of Applications and case studies in engineering geology.	Applications and case studies in engineering geology	Lecture and problem solving	Class questions and assignments
Fifteenth	4	Understand and apply the concepts of Review and applied problems.	Review and applied problems	Lecture and discussion	Class questions and assignments
Sixteenth	4	Assess students' understanding of the course topics.	Preparatory week before the final Exam	Lecture and problem solving	Final Exam

Course Evaluation	
Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, 12, 14, relevant learning outcome LO #1, 2, 3, and 4. Assignments: Formative assessment, time/number 6, weight 18% (18), week due 2, 4, 6, 8, 10, 12, relevant learning outcome LO # 1, 2, 3, 4, 5 and 6. Seminars: Formative assessment, time/number 3, weight 12% (12), week due Continuous. Midterm Exam: Summative assessment, time/number 2, weight 10% (10), week due 7, relevant learning outcome LO # 1-3. Final Exam: Summative assessment, time/number 3, weight 50% (50), week due 16, relevant learning outcome All. Total assessment: 100% (100 Marks).	
Learning and Teaching Resources	
Required prescribed textbooks (methodological, if any)	Engineering Geology and Rock Mechanics, 1980, by N. Duncan, translated by Kanana Mohammed Thabit, Mohammed Ala Al-Din, and Zuhair Ramo.
Main references (sources)	Engineering Geology and Rock Mechanics, 1980, by N. Duncan, translated by Kanana Mohammed Thabit, Mohammed Ala Al-Din, and Zuhair Ramo.
Recommended supporting books and references (scientific journals, reports, etc.)	Fundamentals of Geology, 2009, Dr. Michel Kamel. Properties of Engineering Materials, Saleh Amin, Walid Mohammed, and Talib Hussein. Encyclopedia of Prominent Geologists in Iraq, 2015, Ahmed Jidoua Reda Al-Hiti. Geology and Soil Mechanics Laboratory Experiments, 2018, Khalid Ghassan.
Electronic references and websites	None

Course Description Form

Course Name:
Ethics and Leadership Skills
Course Code:
UOT-011
Semester / Academic Year: Annual
Second / 2025-2026
Date of Preparation of this Description
31/5/2026
Available Attendance Forms:
Total Study Hours / Total Units:
2
Course Coordinator Name (if more than one name is mentioned)
Maysoun Abdullah Mansour Salman
Course Objectives

1. Introduce students to the principles of engineering professional ethics and the importance of professional behavior.
2. Explain the concept of professional ethics and its importance in work and life.
3. Clarify the general foundations of professional ethics and codes of conduct.
4. Develop leadership, communication, and teamwork skills.
5. Introduce the laws and regulations governing professional and public conduct.

Teaching and Learning Strategies

The teaching and learning strategy in this course is based on theoretical lectures, classroom discussion, exercises, applied problems, homework assignments, and laboratory or field activities when available. This strategy aims to encourage student participation, develop critical thinking, link theory with practical application, and monitor learning through questions, quizzes, reports, and examinations.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	4	Understand and apply the concepts of General introduction, principles of engineering professional ethics, keywords, and references.	General introduction, principles of engineering professional ethics, keywords, and references	Lecture and discussion	Class questions and assignments
Second	4	Understand and apply the concepts of Concept of professional ethics, importance of professional ethics in life, and importance of work in human life.	Concept of professional ethics, importance of professional ethics in life, and importance of work in human life	Lecture and problem solving	Class questions and assignments
Third	4	Understand and apply the concepts of General principles of professional ethics.	General principles of professional ethics	Lecture and discussion	Class questions and assignments
Fourth	4	Understand and apply the concepts of Ethics and culture.	Ethics and culture	Lecture and problem solving	Class assignments
Fifth	4	Understand and apply the concepts of Codes of professional conduct.	Codes of professional conduct	Lecture and discussion	Class questions and assignments
Sixth	4	Understand and apply the concepts of Professional ethics in engineering work.	Professional ethics in engineering work	Lecture and problem solving	Class questions and assignments
Seventh	4	Understand and apply the concepts of Leadership skills and communication.	Leadership skills and communication	Lecture and discussion	Class questions and assignments
Eighth	4	Understand and apply the concepts of Teamwork and decision making.	Teamwork and decision making	Lecture and problem solving	Class assignments
Ninth	4	Understand and apply the concepts of Laws and regulations related to professional practice.	Laws and regulations related to professional practice	Lecture and discussion	Class questions and assignments
Tenth	4	Understand and apply the concepts of Responsibility, safety, and public interest.	Responsibility, safety, and public interest	Lecture and problem solving	Class questions and assignments
Eleventh	4	Understand and apply the concepts of Integrity, transparency, and	Integrity, transparency, and avoiding conflicts of interest	Lecture and discussion	Class questions and assignments

		avoiding conflicts of interest.			
Twelfth	4	Understand and apply the concepts of Professional development and lifelong learning.	Professional development and lifelong learning	Lecture and problem solving	Class assignments
Thirteenth	4	Understand and apply the concepts of Case studies in professional ethics.	Case studies in professional ethics	Lecture and discussion	Class questions and assignments
Fourteenth	4	Understand and apply the concepts of Applications of engineering ethics.	Applications of engineering ethics	Lecture and problem solving	Class questions and assignments
Fifteenth	4	Understand and apply the concepts of Review and discussion.	Review and discussion	Lecture and discussion	Class questions and assignments
Sixteenth	4	Assess students' understanding of the course topics.	Preparatory week before the final Exam	Lecture and problem solving	Final Exam

Course Evaluation	
Quizzes: Formative assessment, time/number 2, weight 20% (10), week due 4, 5, 6,8, 10, 12, relevant learning outcome LO #3, 4, 6. Assignments (Home Works): Formative assessment, time/number 5, weight 20% (10), week due continuous, relevant learning outcome LO # 2, 4, 6, 8, 10, 12 and 13. Midterm Exam: Summative assessment, time/number 2, weight 10% (10), week due 8, relevant learning outcome LO # 1-6. Final Exam: Summative assessment, time/number 3, weight 50% (50), week due 16, relevant learning outcome All. Total assessment: 100% (100 Marks).	
Learning and Teaching Resources	
Required prescribed textbooks (methodological, if any)	Rules and Ethics of Engineering Professional Practice, Prof. Eng. Dr. Nabil Abdul-Razzaq Jassim, Dar and Maktabat Al-Bashaer for Printing, Publishing and Distribution, Beirut, Lebanon, 2013.
Main references (sources)	Rules and Ethics of Engineering Professional Practice, Prof. Eng. Dr. Nabil Abdul-Razzaq Jassim, Dar and Maktabat Al-Bashaer for Printing, Publishing and Distribution, Beirut, Lebanon, 2013.
Recommended supporting books and references (scientific journals, reports, etc.)	1-An introduction to Ethics and its Relevance to the Profession of Engineering, Dr. N. Karunakaran.
Electronic references and websites	None

Course Description Form

Course Name:
English Language II
Course Code:
UOT-021
Semester / Academic Year: Annual
Second / 2025-2026
Date of Preparation of this Description
31/5/2026
Available Attendance Forms:
Total Study Hours / Total Units:
2
Course Coordinator Name (if more than one name is mentioned)
Wissam Sameer Mohammed Ali
Course Objectives

Students will be able to: 1. Distinguish between dependent, Independent, and Integrated essays. 2. Find the topic and the thesis statement of short essays. 3. Identify the main ideas from the introduction paragraph. 4. Identify the main ideas from the body paragraph. 5. Find the supporting details from the introduction paragraph. Find the supporting details from the body paragraph. Draw an outline to link the ideas, supporting details, and essay topic. Make notes in response to an essay question to create main ideas, supporting details, and thesis statement. Write the introduction paragraph on basis of the thesis statement and main ideas. Build the body paragraphs based on main ideas and supporting details. Write the introduction paragraph based on the main ideas. Enhance the smoothness and fluency of an essay by employing transition words and sentence starters.	

Teaching and Learning Strategies	
The approach to be followed here is to motivate students to analyze previously written model essays to understand the standard structure of academic essays then implement the same procedures to build their own essays.	

Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
First	2	Understand and apply the concepts of Overview of Academic Essays Independent, Dependent, and Integrated essays Structure of academic essays.	Overview of Academic Essays Independent, Dependent, and Integrated essays Structure of academic essays	Overview of Academic Essays Independent, Dependent, and Integrated essays Structure of academic essays	Overview of Academic Essays Independent, Dependent, and Integrated essays Structure of academic essays
Second	2	Understand and apply the concepts of Structure of academic essays.	Structure of academic essays	Structure of academic essays	Structure of academic essays
Third	2	Understand and apply the concepts of Topic sentence and thesis statement Identifying topic sentence and thesis statement of academic essays..	Topic sentence and thesis statement Identifying topic sentence and thesis statement of academic essays.	Topic sentence and thesis statement Identifying topic sentence and thesis statement of academic essays.	Topic sentence and thesis statement Identifying topic sentence and thesis statement of academic essays.
Fourth	2	Understand and apply the concepts of Main Ideas: Identifying the main Ideas of academic essays..	Main Ideas: Identifying the main Ideas of academic essays.	Main Ideas: Identifying the main Ideas of academic essays.	Main Ideas: Identifying the main Ideas of academic essays.
Fifth	2	Understand and apply the concepts of Supporting Details: Identifying the supporting details.	Supporting Details: Identifying the supporting details	Supporting Details: Identifying the supporting details	Supporting Details: Identifying the supporting details
Sixth	2	Understand and apply the concepts of Essay outlines: Building Essay outlines using idea maps.	Essay outlines: Building Essay outlines using idea maps	Essay outlines: Building Essay outlines using idea maps	Essay outlines: Building Essay outlines using idea maps
Seventh	2	Understand and apply the concepts of Essay Questions: Responding to essay questions by making personal notes.	Essay Questions: Responding to essay questions by making personal notes	Essay Questions: Responding to essay questions by making	Essay Questions: Responding to essay questions by making personal notes

				personal notes	
Eighth	2	Understand and apply the concepts of Topic Sentence : Writing a thesis statement or topic sentence using personal thoughts..	Topic Sentence : Writing a thesis statement or topic sentence using personal thoughts.	Topic Sentence : Writing a thesis statement or topic sentence using personal thoughts.	Topic Sentence : Writing a thesis statement or topic sentence using personal thoughts.
Ninth	2	Understand and apply the concepts of Personal Thoughts: Using personal thoughts to express main ideas and supporting details in response to an essay question..	Personal Thoughts: Using personal thoughts to express main ideas and supporting details in response to an essay question.	Personal Thoughts: Using personal thoughts to express main ideas and supporting details in response to an essay question.	Personal Thoughts: Using personal thoughts to express main ideas and supporting details in response to an essay question.
Tenth	2	Understand and apply the concepts of Idea Map Creation: Building an idea map of an essay question..	Idea Map Creation: Building an idea map of an essay question.	Idea Map Creation: Building an idea map of an essay question.	Idea Map Creation: Building an idea map of an essay question.
Eleventh	2	Understand and apply the concepts of Transition words and sentence starters Increasing the fluency, coherence, and smooth transition of thoughts using sentence starters and transition words..	Transition words and sentence starters Increasing the fluency, coherence, and smooth transition of thoughts using sentence starters and transition words.	Transition words and sentence starters Increasing the fluency, coherence, and smooth transition of thoughts using sentence starters and transition words.	Transition words and sentence starters Increasing the fluency, coherence, and smooth transition of thoughts using sentence starters and transition words.
Twelfth	2	Understand and apply the concepts of Writing the Introduction: Combining the thesis statement and main ideas together to build the introduction paragraph..	Writing the Introduction: Combining the thesis statement and main ideas together to build the introduction paragraph.	Writing the Introduction: Combining the thesis statement and main ideas together to build the introduction paragraph.	Writing the Introduction: Combining the thesis statement and main ideas together to build the introduction paragraph.
Thirteenth	2	Understand and apply the concepts of Writing the Conclusion.	Writing the Conclusion	Writing the Conclusion	Writing the Conclusion
Fourteenth	2	Understand and apply the concepts of Introduction to dependent writing tasks.	Introduction to dependent writing tasks	Introduction to dependent writing tasks	Introduction to dependent writing tasks
Fifteenth	2	Understand and apply the concepts of Final Exam.	Final Exam	Final Exam	Final Exam
Sixteenth	2	Understand and apply the concepts of Lab 1: There are no laboratory experiments..	Lab 1: There are no laboratory experiments.	Lab 1: There are no laboratory experiments.	Lab 1: There are no laboratory experiments.
Course Evaluation	Course Evaluation	Course Evaluation	Course Evaluation	Course Evaluation	Course Evaluation

Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, relevant learning outcome LO #1, 2, 3, 8 and 10.
Assignments: Formative assessment, time/number 2, weight 10% (10), week due 3, 12, relevant learning outcome LO # 5, 6,11 and 12.
Projects / Lab.: Formative assessment.
Report: Formative assessment, time/number 1, weight 20% (20), week due 14, relevant learning outcome LO # 1-10.
Midterm Exam: Summative assessment.
Final Exam: Summative assessment, time/number 3hr, weight 60% (60), week due 15, relevant learning outcome All.
Total assessment: 100% (100 Marks).

Learning and Teaching Resources

Required prescribed textbooks (methodological, if any)

Main references (sources)	No Textbook is required for this course. Supplemental materials will be provided by provided by the instructor.
Recommended supporting books and references (scientific journals, reports, etc.)	Sharpe, P. J. (2009). Barron's TOEFL iBT. Barron's Educational Series. Lougheed, L. (2016). Barron's Ielts with Mp3 Cd. Barron's.
Electronic references and websites	None
Electronic references and websites	None

Engineering Analysis (MATH-301)

Course Description Form	
1. Course Name:	Engineering Analysis
2. Course Code:	MATH-301
3. Semester / Year:	Fifth / 2025-2026
4. Date of Preparation:	01/11/2025
5. Available Attendance Forms:	Theoretical lectures, tutorials, and practical applications when needed
6. Total Study Hours / Total Units:	3 hours weekly / 4 units
7. Course Instructor Name (if more than one, mention all):	Firas Hazem Jasim Mohammed
8. Course Objectives	To introduce students to the concept of differential equations and their significance in engineering and scientific applications. To provide students with the necessary skills to solve first order differential equations using separation of variables, and to classify them as homogeneous, non-homogeneous, exact and non-exact D.E's. To teach students how to solve linear and non-linear first order differential equations, as well as higher order differential equations. To familiarize students with the solution of second and higher order linear differential equations, with both constant and variable coefficients, and to teach them how to apply the variation of parameters method. To provide students with an understanding of simultaneous linear differential equations and their applications in engineering. To equip students with the ability to analyze physical and engineering problems by setting up and solving differential equations. To impart an understanding of Laplace transforms and how they can be used for the solution of differential equations. Overall, this course aims to provide a thorough understanding of differential equations and their use in various engineering and scientific applications. By the end of this module, students should be able to solve a variety of differential equations, both analytically and numerically, and apply this knowledge to real-world problems.
9. Teaching and Learning Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	3	Understand the topic and apply its concepts in exercises and engineering problems.	Defintion, Forming,Order and Degree of Differential Equation	Lecture and exercises	Class questions and assignments
Week 2	3	Understand the topic and apply its concepts in exercises and engineering problems.	Solution of the first order D.E.Separation of variables	Lecture and exercises	Class questions and assignments
Week 3	3	Understand the topic and apply its concepts in exercises and engineering problems.	Homogeneous, non-homogeneous Exact and not exact D.E	Lecture and exercises	Class questions and assignments
Week 4	3	Understand the topic and apply its concepts in exercises and engineering problems.	Linear and nonlinear first order D.E	Lecture and exercises	Class questions and assignments
Week 5	3	Understand the topic and apply its concepts in exercises and engineering problems.	First order and higher degree D.E	Lecture and exercises	Class questions and assignments
Week 6	3	Understand the topic and apply its concepts in exercises and engineering problems.	Solution of second and higher order linear D.E	Lecture and exercises	Class questions and assignments
Week 7	3	Understand the topic and apply its concepts in exercises and engineering problems.	Solution of second and higher order linear D.E with constant coefficient	Lecture and exercises	Class questions and assignments
Week 8	3	Understand the topic and apply its concepts in exercises and engineering problems.	Solution of second and higher order linear D.E with variation of parameter	Lecture and exercises	Class questions and assignments
Week 9	3	Understand the topic and apply its concepts in exercises and engineering problems.	Simultaneous linear D.E	Lecture and exercises	Class questions and assignments
Week 10	3	Understand the topic and apply its concepts in exercises and engineering problems.	Physical and engineering application on first order D.E	Lecture and exercises	Class questions and assignments
Week 11	3	Understand the topic and apply its concepts in exercises and engineering problems.	Physical and engineering application on first order D.E	Lecture and exercises	Class questions and assignments
Week 12	3	Understand the topic and apply its concepts in exercises and engineering problems.	Physical and engineering application on second order D.E Physical and engineering application on second order D.E	Lecture and exercises	Class questions and assignments
Week 13	3	Understand the topic and apply its concepts in exercises and	Physical and engineering application on second order D.E Physical and engineering application on	Lecture and exercises	Class questions and assignments

		engineering problems.	second order D.E		
Week 14	3	Understand the topic and apply its concepts in exercises and engineering problems.	Laplace Transform	Lecture and exercises	Class questions and assignments
Week 15	3	Understand the topic and apply its concepts in exercises and engineering problems.	Laplace Transform	Lecture and exercises	Class questions and assignments
Week 16	3	Assess students' understanding of the previous topics.	Preparatory week before the final Exam	Lecture and exercises	Exam

11. Course Evaluation

Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, relevant learning outcome LO #1, 2 and 5.
Assignments: Formative assessment, time/number 2, weight 10% (10), week due 2, 12, relevant learning outcome LO # 3 and 4.
Projects / Lab.: Formative assessment, time/number 10, weight 10% (10), week due Continuous, relevant learning outcome All.
Report: Formative assessment, time/number 1, weight 10% (10), week due 13, relevant learning outcome All.
Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1 ,2 and 3.
Final Exam: Summative assessment, time/number 2hr, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required Textbooks (methodological, if any)	Theory and Problems of Differential Equations
Main References (sources)	Theory and Problems of Differential Equations
Supporting Books and References Recommended (scientific journals, reports, etc.)	By Frank Ayres, JR,PhD Advanced Engineering Mathematics By Dass
Electronic References / Websites	None

2. Structural Analysis (DWRE-301)

Course Description Form

1. Course Name:	Structural Analysis
2. Course Code:	DWRE-301
3. Semester / Year:	Fifth / 2025-2026
4. Date of Preparation:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures, tutorials, and practical applications when needed
6. Total Study Hours / Total Units:	2 hours weekly / 5 units
7. Course Instructor Name (if more than one, mention all):	Aziz I. Abdullah
8. Course Objectives	Study the basic principles for structures. Analyze the statically determinate structures. Determine the elastic deformations of the statically determinate structures by using different methods. Solve the indeterminate statically structures by using different methods.
9. Teaching and Learning Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	2	Understand the topic and apply its concepts in exercises and engineering problems.	Stability and determinacy of structures, Analysis of the statically determinate structures	Lecture and exercises	Class questions and assignments
Week 2	2	Understand the topic and apply its concepts in exercises and engineering problems.	The elastic deformation of beams by virtual work (unit load) method, The elastic deformation of frames by virtual work (unit load) method	Lecture and exercises	Class questions and assignments
Week 3	2	Understand the topic and apply its concepts in exercises and engineering problems.	The elastic deformation of trusses by virtual work (unit load) method	Lecture and exercises	Class questions and assignments
Week 4	2	Understand the topic and apply its concepts in exercises and engineering problems.	The elastic deformation of beams by Castigliano`s first theorem method, The elastic deformation of frames by Castigliano`s first theorem method	Lecture and exercises	Class questions and assignments
Week 5	2	Understand the topic and apply its concepts in exercises and engineering problems.	The elastic deformation of trusses by Castigliano`s first theorem method	Lecture and exercises	Class questions and assignments
Week 6	2	Assess students' understanding of the previous topics.	Exam I	Lecture and exercises	Exam
Week 7	2	Understand the topic and apply its concepts in exercises and engineering problems.	Analysis the statically indeterminate beams by method of consistent deformation, Analysis the statically indeterminate frames by method of consistent deformation	Lecture and exercises	Class questions and assignments
Week 8	2	Understand the topic and apply its concepts in exercises and engineering problems.	Analysis the statically indeterminate trusses by method of consistent deformation	Lecture and exercises	Class questions and assignments
Week 9	2	Understand the topic and apply its concepts in exercises and engineering problems.	Analysis the statically indeterminate beams by least work method	Lecture and exercises	Class questions and assignments
Week 10	2	Understand the topic and apply its concepts in exercises and engineering problems.	Analysis the statically indeterminate frames by least work method	Lecture and exercises	Class questions and assignments
Week 11	2	Understand the topic and apply its concepts in exercises and engineering problems.	Analysis the statically indeterminate beams by slope-deflection method	Lecture and exercises	Class questions and assignments
Week 12	2	Understand the topic and apply its concepts in exercises and engineering problems.	Analysis the statically indeterminate frames by slope-deflection method	Lecture and exercises	Class questions and assignments
Week 13	2	Understand the topic and apply its concepts in exercises and engineering problems.	Analysis the statically indeterminate beams by moment distribution method	Lecture and exercises	Class questions and assignments
Week 14	2	Understand the topic and apply its concepts in exercises and engineering problems.	Analysis the statically indeterminate frames by moment distribution method	Lecture and exercises	Class questions and assignments
Week 15	2	Assess students' understanding of the previous topics.	Exam II	Lecture and exercises	Exam
Week 16	2	Assess students' understanding of the previous topics.	Preparatory week before the final Exam	Lecture and exercises	Exam

11. Course Evaluation

Quizzes: Formative assessment, time/number 1, weight 5% (5), week due 11, relevant learning outcome LO #5 and 6.
Assignments: Formative assessment, time/number 2, weight 5% (5), week due 5, 14, relevant learning outcome LO # 3-8.
Midterm Exam: Summative assessment, time/number 2, weight 30% (30), week due 6, 15, relevant learning outcome LO # 1-4 and 5-8.
Final Exam: Summative assessment, time/number 3hr, weight 60% (60), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required Textbooks (methodological, if any)	Elementary Theory of Structures, YUAN-YU HSIEH, PRETICE-HALL, 1980.
Main References (sources)	Elementary Theory of Structures, YUAN-YU HSIEH, PRETICE-HALL, 1980.
Supporting Books and References Recommended (scientific journals, reports, etc.)	Hibbeler R. C. (2012). Structural analysis (8th ed.). Pearson/Prentice Hall.
Electronic References / Websites	None

3. Soil Mechanics I (DWRE-302)

Course Description Form	
1. Course Name:	Soil Mechanics I
2. Course Code:	DWRE-302
3. Semester / Year:	Fifth / 2025-2026
4. Date of Preparation:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures, tutorials, and practical applications when needed
6. Total Study Hours / Total Units:	2 hours weekly / 5 units
7. Course Instructor Name (if more than one, mention all):	Mazin Ali Hussein Ahmed
8. Course Objectives	The course aims to provide students with the necessary background information about soil mechanics. The course aims to: 1- Provide students with a fundamental understanding of the principle of soil mechanics, soils' properties, states, behavior, and mechanics. 2- Give students training on solving problems by applying the theories and principles in soil mechanics. 3- Solve problems based on phase relationships, and soil classification according to various international classification systems and determine the suitability of soils for engineering purposes. 4- Understand the principles of soil mechanics and it is application: Flow of water through the soil, permeability, seepage. The principle of effective stress and its implications. Consolidation and calculate elastic and consolidation settlements. 5- Understand the soil improvement and stabilization techniques.
9. Teaching and Learning Strategies	A combination of theoretical classes and laboratory practical classes On completion of this course, the student will be able to: Demonstrate ability to explain the multiphase nature of soils and to derive quantities relating to the volumes and masses of the different phases of a soil Describe the ability to apply the effective stress concept to solve elementary geotechnical problems Determine and classify soils. Establish skills in soil permeability and compaction measurement and skills in the solution of seepage-related problems. Developing the student's ability to make decisions in the field.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	2	Understand the topic and apply its concepts in exercises and engineering problems.	Introduction to soil engineering	Lecture and exercises	Class questions and assignments
Week 2	2	Understand the topic and apply its concepts in exercises and engineering problems.	Physico–mechanical properties of soil	Lecture and exercises	Class questions and assignments
Week 3	2	Understand the topic and apply its concepts in exercises and engineering problems.	Soil classification	Lecture and exercises	Class questions and assignments
Week 4	2	Understand the topic and apply its concepts in exercises and engineering problems.	Soil classification	Lecture and exercises	Class questions and assignments
Week 5	2	Understand the topic and apply its concepts in exercises and engineering problems.	Permeability & seepage flow in soils	Lecture and exercises	Class questions and assignments
Week 6	2	Understand the topic and apply its concepts in exercises and engineering problems.	Permeability & seepage flow in soils	Lecture and exercises	Class questions and assignments
Week 7	2	Understand the topic and apply its concepts in exercises and engineering problems.	Permeability & seepage flow in soils	Lecture and exercises	Class questions and assignments
Week 8	2	Understand the topic and apply its concepts in exercises and engineering problems.	Permeability & seepage flow in soils	Lecture and exercises	Class questions and assignments
Week 9	2	Understand the topic and apply its concepts in exercises and engineering problems.	Stresses within soil mass (Internals Stresses)	Lecture and exercises	Class questions and assignments
Week 10	2	Understand the topic and apply its concepts in exercises and engineering problems.	Stresses within soil mass (External Stresses)	Lecture and exercises	Class questions and assignments
Week 11	2	Understand the topic and apply its concepts in exercises and engineering problems.	Consolidation and Compressibility of the soil	Lecture and exercises	Class questions and assignments
Week 12	2	Understand the topic and apply its concepts in exercises and engineering problems.	Consolidation and Compressibility of the soil	Lecture and exercises	Class questions and assignments
Week 13	2	Understand the topic and apply its concepts in exercises and engineering problems.	Consolidation and Compressibility of the soil	Lecture and exercises	Class questions and assignments
Week 14	2	Understand the topic and apply its	Soil Stabilization	Lecture and exercises	Class questions and

		concepts in exercises and engineering problems.			assignments
Week 15	2	Understand the topic and apply its concepts in exercises and engineering problems.	Soil Stabilization	Lecture and exercises	Class questions and assignments
Week 16	2	Assess students' understanding of the previous topics.	Preparatory week before the final Exam	Lecture and exercises	Exam

11. Course Evaluation

Quizzes: Formative assessment, time/number 3, weight 10% (10), week due 3,7, 10, relevant learning outcome LO # 1 and 2.
Assignments: Formative assessment, time/number 3, weight 10% (10), week due 4,8, 11, relevant learning outcome LO # 2 and 4.
Lab: Formative assessment, time/number 1, weight 10% (10), week due Continuous, relevant learning outcome LO # 3 and 5.
Report: Formative assessment, time/number 11, weight 10% (10), week due Every week, relevant learning outcome LO # 4 and 5.
Midterm Exam: Summative assessment, time/number 2hr, weight 10% (10), week due 7, relevant learning outcome LO # 1, 2 and 3.
Final Exam: Summative assessment, time/number 3hr, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required Textbooks (methodological, if any)	"Principles of Geotechnical Engineering",(2007), Braja M. Das, 5th edition 2002, copyright by Wadsworth Group/United Stated. "Principal of Soil Mechanic", (1991), Mohammed O. AL-Asho, (Book language in Arabic).
Main References (sources)	"Principles of Geotechnical Engineering",(2007), Braja M. Das, 5th edition 2002, copyright by Wadsworth Group/United Stated. "Principal of Soil Mechanic", (1991), Mohammed O. AL-Asho, (Book language in Arabic).
Supporting Books and References Recommended (scientific journals, reports, etc.)	"Elements of Soil Mechanics", (1988), G. N. Smith and Ion G. N. Smith, USA. "Problem Solving in Soil Mechanics", (2003), A. Aysen, Swets & Zeitlinger B.V
Electronic References / Websites	None

4. Engineering Hydrology I (DWRE-303)

Course Description Form	
1. Course Name:	Engineering Hydrology I
2. Course Code:	DWRE-303
3. Semester / Year:	Fifth / 2025-2026
4. Date of Preparation:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures, tutorials, and practical applications when needed
6. Total Study Hours / Total Units:	2 hours weekly / 6 units
7. Course Instructor Name (if more than one, mention all):	Ruqayya Abdul-Hussein Jumaa Al-Tikriti
8. Course Objectives	Surface Water hydrology is essential for third-stage dams and water resources engineering students in order to • Provides an introduction to hydrological processes; measurements and modelling. It focuses on practical applications of hydrology • Quantify the hydrologic processes and integrate them into hydrologic design procedures. • know and understand the basic principles and equations used for surface water hydrology, and the main characteristics of the different types of hydrologic simulators.
9. Teaching and Learning Strategies	The essential strategy of this module is to motivate students to Use real-world data to develop a water budget for unfamiliar basins. Identify interconnections in hydrological systems and predict changes. Predictions of hydrological terms influencing the hydrological cycle. Collection of data, analysis and interpretation.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	2	Understand the topic and apply its concepts in exercises and engineering problems.	Hydrological definition, The hydrological cycle, Global Water Balance The water balance equation or the hydrological equation Google earth software	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 2	2	Understand the topic and apply its concepts in exercises and engineering problems.	Engineering applications of hydrology, Typical failure factors for hydraulic installations Google earth software	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 3	2	Understand the topic and apply its concepts in exercises and engineering problems.	Climate elements: Introduction, Temperatures, solar radiation Evaporation, moisture, Atmospheric pressure, and wind. Google earth software	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 4	2	Understand the topic and apply its concepts in exercises and engineering problems.	Precipitation: Forms of precipitation, Precipitation measurement, Precipitation measuring grid, Initialize the information, Check the smoothness of records, Precipitation measurement methods, The hectograph Global mapper software	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 5	2	Understand the topic and apply its concepts in exercises and engineering problems.	Precipitation losses: The loss from the rainfall, Evaporation process, Evaporation gauges, Evaporation stations Global mapper software	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 6	2	Understand the topic and apply its concepts in exercises and engineering problems.	Empirical evapotranspiration equations, Analytical methods for estimating evapotranspiration. Global mapper software	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 7	2	Understand the topic and apply its concepts in exercises and engineering problems.	Runoff: Factors affecting the value or volume of surface runoff, Division of surface runoff WMS software	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 8	2	Assess students' understanding of the previous topics.	First Monthly Exam	Lecture, problem solving, and computer applications	Exam
Week 9	2	Understand the topic and apply its concepts in exercises and engineering problems.	Hydrograph, The flow characteristics of the streams Empirical equations, Flow Curve Characteristics – Sustainability, Cumulative (mass) flow curve. WMS software	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 10	2	Understand the topic and apply its concepts in exercises and engineering problems.	Calculation of storage volume, Calculations of an accepted order WMS software	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 11	2	Understand the topic and apply its concepts in exercises and engineering problems.	Hydrograph: Introduction, Factors affecting flood hydrograph, Hydrograph Components, Separation of the hydrograph, effecting rainfall WMS software	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 12	2	Understand the topic and apply its concepts in exercises and engineering problems.	Standard hydrograph, Derivation of the standard hydrograph Standard hydrographs of different durations, The uses, and limitations of the standard hydrograph. WMS software	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 13	2	Understand the topic and apply its concepts in exercises and engineering problems.	Flood routing Microsoft Excel	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 14	2	Understand the topic and apply its concepts in exercises and	Reservoir routing- channel routing Microsoft Excel	Lecture, problem solving, and computer applications	Assignments and computer applications

		engineering problems.			
Week 15	2	Assess students' understanding of the previous topics.	Second monthly exam.	Lecture, problem solving, and computer applications	Exam
Week 16	2	Assess students' understanding of the previous topics.	The preparatory week before the Final Exam	Lecture, problem solving, and computer applications	Exam

11. Course Evaluation

First monthly Exam: Formative assessment, time/number 2 hr, weight 15% (15), week due 8, relevant learning outcome #1, 2, 3 and 4.
Second monthly Exam: Formative assessment, time/number 2hr, weight 15% (15), week due 15, relevant learning outcome # 5, 6 and 7.
Class work: Summative assessment, time/number 2 hr, weight 10% (10), week due 5,7,9,10,12,
13, relevant learning outcome All.
Final Exam: Summative assessment, time/number 3hr, weight 60% (60), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required Textbooks (methodological, if any)	Ward, Roy C., and Mark Robinson. Principles of hydrology. Vol. 367. London: McGraw-Hill, 1975.
Main References (sources)	Ward, Roy C., and Mark Robinson. Principles of hydrology. Vol. 367. London: McGraw-Hill, 1975.
Supporting Books and References Recommended (scientific journals, reports, etc.)	Raghunath, H. M. (2006). Hydrology: principles, analysis and design. New Age International. Hiscock, K. M., & Bense, V. F. (2014). Hydrogeology: principles and practice. John Wiley & Sons.
Electronic References / Websites	https://www.youtube.com/watch?v=bOkzVV9VLRI https://www.ldeo.columbia.edu/~martins/hydro/syl_p.html

5. Open Channels Hydraulics (DWRE-304)

Course Description Form

1. Course Name:	Open Channels Hydraulics
2. Course Code:	DWRE-304
3. Semester / Year:	Fifth / 2025-2026
4. Date of Preparation:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures, tutorials, and practical applications when needed
6. Total Study Hours / Total Units:	3 hours weekly / 6 units
7. Course Instructor Name (if more than one, mention all):	Raad Hubi Arzuqi Jasim
8. Course Objectives	On successful completion of this course students will be able to: Recognize the common physical phenomenon of flow in open channel Classify the type of flow and the properties for each type, with the common empirical equations Define the specific energy of the flow in open channel and connect that with practical cases that happen in reality Route the curve of surface water profile when there is a structure in open channel Recognize the main typed of pumps used in water resources engineering and how the connect each other and define the main requirements to design the right one
9. Teaching and Learning Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials, class works and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	3	Understand the topic and apply its concepts in exercises and engineering problems.	Open channel, types and classifications.	Lecture, problem solving, and computer applications	Class questions and assignments
Week 2	3	Understand the topic and apply its concepts in exercises and engineering problems.	Uniform flow, Chezy and Manning equations.	Lecture, problem solving, and computer applications	Class questions and assignments
Week 3	3	Understand the topic and apply its concepts in exercises and engineering problems.	Best hydraulic cross section	Lecture, problem solving, and computer applications	Class questions and assignments
Week 4	3	Understand the topic and apply its concepts in exercises and engineering problems.	Consecration of hydraulic radius and Manning coefficient	Lecture, problem solving, and computer applications	Class questions and assignments
Week 5	3	Understand the topic and apply its concepts in exercises and engineering problems.	Specific energy and critical depth.	Lecture, problem solving, and computer applications	Class questions and assignments
Week 6	3	Understand the topic and apply its concepts in exercises and engineering problems.	Critical depth with humps or contractions	Lecture, problem solving, and computer applications	Class questions and assignments
Week 7	3	Understand the topic and apply its concepts in exercises and engineering problems.	Hydraulic jump	Lecture, problem solving, and computer applications	Class questions and assignments
Week 8	3	Understand the topic and apply its concepts in exercises and engineering problems.	Varied flow	Lecture, problem solving, and computer applications	Class questions and assignments
Week 9	3	Understand the topic and apply its concepts in exercises and engineering problems.	water surface profile	Lecture, problem solving, and computer applications	Class questions and assignments
Week 10	3	Understand the topic and apply its concepts in exercises and engineering problems.	Weirs and notches	Lecture, problem solving, and computer applications	Class questions and assignments
Week 11	3	Understand the topic and apply its concepts in exercises and engineering problems.	Empirical Formulae for Discharge Over Rectangular Weir	Lecture, problem solving, and computer applications	Class questions and assignments
Week 12	3	Understand the topic and apply its concepts in exercises and engineering problems.	Time Required to empty a Reservoir or a Tank with Rectangular and Triangular Weirs or Notches	Lecture, problem solving, and computer applications	Class questions and assignments
Week 13	3	Understand the topic and apply its concepts in exercises and engineering problems.	Measurement of Flow of Irregular Channels	Lecture, problem solving, and computer applications	Class questions and assignments
Week 14	3	Understand the topic and apply its concepts in exercises and engineering problems.	Software: HEC-RAS, steady flow in channels	Lecture, problem solving, and computer applications	Class questions and assignments
Week 15	3	Understand the topic and apply its concepts in exercises and engineering problems.	Software: HEC-RAS, unsteady flow in channels	Lecture, problem solving, and computer applications	Class questions and assignments
Week 16	3	Assess students' understanding of the previous topics.	Preparatory week before the final Exam	Lecture, problem solving, and computer applications	Exam

11. Course Evaluation

Quizzes: Formative assessment, time/number 3, weight 15% (10), week due 4, 8, 12, relevant learning outcome LO #1, 2, 10 and 11.
Assignments: Formative assessment, time/number 5, weight 15% (15), week due 2,4,6,8,10, relevant learning outcome LO # 3, 4, 6 and 7.
Projects / Lab.: Formative assessment, time/number 0.
Report: Formative assessment.
Monthly exam: Formative assessment, time/number 2, weight 20% (20), week due 6,13, relevant learning outcome all.
Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1-6.
Final Exam: Summative assessment, time/number 2hr, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required Textbooks (methodological, if any)	Vennard, J.K., 1963. Elementary fluid mechanics. 4th edition.
Main References (sources)	Vennard, J.K., 1963. Elementary fluid mechanics. 4th edition.
Supporting Books and References Recommended (scientific journals, reports, etc.)	Rajput, R.K., 2004. A textbook of fluid mechanics and hydraulic machines. S. Chand Publishing.
Electronic References / Websites	https://www.coursera.org/browse/physical-science-and-engineering

6. Engineering Economy and Management (DWRE-305)

Course Description Form	
1. Course Name:	Engineering Economy and Management
2. Course Code:	DWRE-305
3. Semester / Year:	Fifth / 2025-2026
4. Date of Preparation:	01/11/2025
5. Available Attendance Forms:	Theoretical lectures, tutorials, and practical applications when needed
6. Total Study Hours / Total Units:	2 hours weekly / 4 units
7. Course Instructor Name (if more than one, mention all):	Maysoun Abdullah Mansour Salman
8. Course Objectives	
9. Teaching and Learning Strategies	The teaching and learning strategy in this course is based on theoretical lectures, solved examples, class exercises, interactive discussions, homework assignments, and practical or computer applications when applicable. The strategy aims to encourage student participation, develop critical thinking, connect theoretical concepts with engineering practice in dams and water resources engineering, and monitor learning through questions, quizzes, assignments, reports, and examinations.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	2	Understand the topic and apply its concepts in exercises and engineering problems.	Introduction - The construction industry , Management functions and elements.	Lecture and exercises	Class questions and assignments
Week 2	2	Understand the topic and apply its concepts in exercises and engineering problems.	Construction project scheduling and planning : Network Analysis Technique	Lecture and exercises	Class questions and assignments
Week 3	2	Understand the topic and apply its concepts in exercises and engineering problems.	Updating in Arrow Diagram ,Time grid method	Lecture and exercises	Class questions and assignments
Week 4	2	Understand the topic and apply its concepts in exercises and engineering problems.	Program Evaluation Review Technique (PERT) , - Line of balance	Lecture and exercises	Class questions and assignments
Week 5	2	Understand the topic and apply its concepts in exercises and engineering problems.	Crushed Program	Lecture and exercises	Class questions and assignments
Week 6	2	Understand the topic and apply its concepts in exercises and engineering problems.	Resource programming	Lecture and exercises	Class questions and assignments
Week 7	2	Assess students' understanding of the previous topics.	Midterm exam	Lecture and exercises	Exam
Week 8	2	Understand the topic and apply its concepts in exercises and engineering problems.	Cash Flow Forecasting	Lecture and exercises	Class questions and assignments
Week 9	2	Understand the topic and apply its concepts in exercises and engineering problems.	Engineering Economics: - Supply and Demand- Break Even Point	Lecture and exercises	Class questions and assignments
Week 10	2	Understand the topic and apply its concepts in exercises and engineering problems.	Principles of the feasibility study	Lecture and exercises	Class questions and assignments
Week 11	2	Understand the topic and apply its concepts in exercises and engineering problems.	Time factor and its impact on capital: - Simple &Compound Interest ,Nominal and Effective Interest Rate , Inflation	Lecture and exercises	Class questions and assignments
Week 12	2	Understand the topic and apply its concepts in exercises and engineering problems.	Depreciation: Straight Line Method, Declining Balance Method, Sum of the years Digits, Sinking Fond method,	Lecture and exercises	Class questions and assignments
Week 13	2	Understand the topic and apply its concepts in exercises and engineering problems.	Economic Comparisons of Alternatives: Present Worth Method, Internal Rate of Return Method, Annual Worth Method, : -Future Worth Method, and Benefit / Cost Ratio	Lecture and exercises	Class questions and assignments
Week 14	2	Understand the topic and apply its concepts in exercises and engineering problems.	Engineering Ethics: Why Study Engineering Ethics, Professionalism and Codes of Ethics , Understanding Ethical Problems	Lecture and exercises	Class questions and assignments
Week 15	2	Understand the topic and apply its concepts in exercises and engineering problems.	Engineering Ethics: Ethical Problem-Solving Techniques , Risk, Safety, and Accidents, The Rights and Responsibilities of Engineers	Lecture and exercises	Class questions and assignments
Week 16	2	Assess students' understanding of the previous topics.	Final Exam	Lecture and exercises	Exam

11. Course Evaluation

Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, 12, 14, relevant learning outcome LO #1, 2, and 3.
Assignments: Formative assessment, time/number 6, weight 18% (18), week due 2, 4, 6, 8, 10, 12, relevant learning outcome LO # 1, 2, 3, 4, 5 ,6 and 7.
Seminars: Formative assessment, time/number 3, weight 12% (12), week due Continuous.
Midterm Exam: Summative assessment, time/number 2, weight 10% (10), week due 7, relevant learning outcome LO # 1-4.
Final Exam: Summative assessment, time/number 3, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required Textbooks (methodological, if any)	1. Principles of Construction Management by:Roy Pilcher. 1992Publisher: Pearson ISBN-10: 0070940274 ,ISBN-13 : 978-0070940277 2. Engineering Economy by De Garms . 1988.Edition 8th Publisher: Collier Macmillan, ISBN-10 :0023286342: ISBN-13 :978-0023286346 3.Engineering Ethics: Concepts and Cases, Fourth Edition Charles E. Harris, Michael S. Pritchard, and Michael J. RabinLibrary of Congress Control Number: 2008924940, ISBN-13: 978-0-495-50279-1 ISBN-10: 0-495-50279-0 Wadsworth10 Davis Drive Belmont, CA 94002-3098 USA 4. Engineering Ethics by CHARLES B. FLEDDERMANN, Fourth Edition Library of Congress Cataloging-in-Publication Data
Main References (sources)	1. Principles of Construction Management by:Roy Pilcher. 1992Publisher: Pearson ISBN-10: 0070940274 ,ISBN-13 : 978-0070940277 2. Engineering Economy by De Garms . 1988.Edition 8th Publisher: Collier Macmillan, ISBN-10 :0023286342: ISBN-13 :978-0023286346 3.Engineering Ethics: Concepts and Cases, Fourth Edition Charles E. Harris, Michael S. Pritchard, and Michael J. RabinLibrary of Congress Control Number: 2008924940, ISBN-13: 978-0-495-50279-1 ISBN-10: 0-495-50279-0 Wadsworth10 Davis Drive Belmont, CA 94002-3098 USA 4. Engineering Ethics by CHARLES B. FLEDDERMANN, Fourth Edition Library of Congress Cataloging-in-Publication Data
Supporting Books and References Recommended (scientific journals, reports, etc.)	1.Modren Construction Management by: F.Harris , 2001 Edition 5th Publisher: Wiley-Blackwell ISBN-10632055138, ISBN-13 978-: 0632055135 2.Construction planning ,Equipment and Methods , by Robert L. Peurifoy, 2018. 3.Critical Path Method in Construction Practice by: Antil ,1990
Electronic References / Websites	www.Pathways.cu.edu.eg

7. Numerical Analysis (MATH-302)

Course Description Form	
1. Course Name:	Numerical Analysis
2. Course Code:	MATH-302
3. Semester / Year:	Sixth / 2025-2026
4. Date of Preparation:	01/11/2025
5. Available Attendance Forms:	Theoretical lectures, tutorials, and practical applications when needed
6. Total Study Hours / Total Units:	3 hours weekly / 4 units
7. Course Instructor Name (if more than one, mention all):	Mustafa Diaa Othman Ali
8. Course Objectives	The primary aims of this course are to: Familiarize students with numerical methods for solving complex mathematical problems, including numerical integration, differentiation, and the solutions of differential equations. Equip students with the skills necessary to obtain accurate numerical solutions to mathematical problems that cannot be solved analytically. Students will develop the ability to analyze and minimize errors and approximations inherent in these methods. Educate students about common sources of error and approximation in numerical methods, including truncation error, rounding error, and discretization error. Provide students with mastery over the techniques for solving equations in one variable, including the bisection method, secant method, Newton-Raphson method, and fixed-point iteration method. After taking the course. Allow students to develop a deep understanding of the available methods for solving simultaneous equations, such as Gaussian elimination, LU decomposition, Gauss-Seidel method, and Jacobi method, and their underlying principles.
9. Teaching and Learning Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	3	Understand the topic and apply its concepts in exercises and engineering problems.	Numerical Methods: Iteration and graphical method	Lecture and exercises	Class questions and assignments
Week 2	3	Understand the topic and apply its concepts in exercises and engineering problems.	Newton-Raphson's method and False position method	Lecture and exercises	Class questions and assignments
Week 3	3	Understand the topic and apply its concepts in exercises and engineering problems.	Taylor's series and Euler's method	Lecture and exercises	Class questions and assignments
Week 4	3	Understand the topic and apply its concepts in exercises and engineering problems.	Runge's -Kutta method	Lecture and exercises	Class questions and assignments
Week 5	3	Understand the topic and apply its concepts in exercises and engineering problems.	Indeterminate weight method and Integration method	Lecture and exercises	Class questions and assignments
Week 6	3	Understand the topic and apply its concepts in exercises and engineering problems.	Interpolation:Greagory Newton forward interpolation method	Lecture and exercises	Class questions and assignments
Week 7	3	Understand the topic and apply its concepts in exercises and engineering problems.	Gauss-Guadpruter method	Lecture and exercises	Class questions and assignments
Week 8	3	Understand the topic and apply its concepts in exercises and engineering problems.	Defintion, Forming,Order and Degree of Difference equations	Lecture and exercises	Class questions and assignments
Week 9	3	Understand the topic and apply its concepts in exercises and engineering problems.	Defintion, Forming,Order and Degree of Difference equations	Lecture and exercises	Class questions and assignments
Week 10	3	Understand the topic and apply its concepts in exercises and engineering problems.	Solution of Difference equations	Lecture and exercises	Class questions and assignments
Week 11	3	Understand the topic and apply its concepts in exercises and engineering problems.	Gauss, Jacopi's and Gauss-seidel method	Lecture and exercises	Class questions and assignments
Week 12	3	Understand the topic and apply its concepts in exercises and engineering problems.	Central differences	Lecture and exercises	Class questions and assignments
Week 13	3	Understand the topic and apply its concepts in exercises and engineering problems.	Central differences	Lecture and exercises	Class questions and assignments
Week 14	3	Understand the topic and apply its concepts in exercises and engineering problems.	Derivative of Newton forward and backward differences	Lecture and exercises	Class questions and assignments
Week 15	3	Understand the topic and apply its concepts in exercises and	Derivative of Newton forward and backward differences	Lecture and exercises	Class questions and assignments

		engineering problems.			
Week 16	3	Assess students' understanding of the previous topics.	Preparatory week before the final Exam	Lecture and exercises	Exam

11. Course Evaluation

Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, relevant learning outcome LO #1, 2 and 5.
Assignments: Formative assessment, time/number 2, weight 10% (10), week due 2, 12, relevant learning outcome LO # 3 and 4.
Projects / Lab.: Formative assessment, time/number 10, weight 10% (10), week due Continuous, relevant learning outcome All.
Report: Formative assessment, time/number 1, weight 10% (10), week due 13, relevant learning outcome All.
Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1 ,2 and 3.
Final Exam: Summative assessment, time/number 2hr, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required Textbooks (methodological, if any)	Numerical Analysis
Main References (sources)	Numerical Analysis
Supporting Books and References Recommended (scientific journals, reports, etc.)	Numerical Analysis By Dass
Electronic References / Websites	None

8. Concrete Design (DWRE-306)

Course Description Form	
1. Course Name:	Concrete Design
2. Course Code:	DWRE-306
3. Semester / Year:	Sixth / 2025-2026
4. Date of Preparation:	1/11/2023
5. Available Attendance Forms:	Theoretical lectures, tutorials, and practical applications when needed
6. Total Study Hours / Total Units:	2 hours weekly / 5 units
7. Course Instructor Name (if more than one, mention all):	Hosam Abdullah Daham
8. Course Objectives	To understand concrete characteristics. To understand safety and serviceability factors. To understand the crack and uncrack concrete behavior. To understand and apply engineering principles, science and mathematics to solve engineering problems. To understand the code provisions and enrich the design skills
9. Teaching and Learning Strategies	Power point presentation and multimedia tools are used in classrooms; Examples and problems will be solved and illustrated on the classroom board; Tutorials are also organized to establish a closer contact with students. Students are encouraged to use the Internet to search for various topics, including contents of similar courses offered elsewhere. MS Excel software is used for preparing projects. Students can reach the teaching material, solved problems, data sheets, past exam papers etc. on the allocated Web site. The instructor will be happy to answer questions related to course content via email. Complex technical questions should be addressed in tutorial, during office hours, or by appointment. Emails must come from official University email addresses. The instructor will not respond to outside email addresses.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	2	Understand the topic and apply its concepts in exercises and engineering problems.	Introduction; syllabus; Advantages and Disadvantages of Reinforced Concrete as a Structural Material; Mechanical properties of concrete; steel. Concrete and steel grading; design philosophy; Loading types.	Lecture, problem solving, and computer applications	Class questions and assignments
Week 2	2	Understand the topic and apply its concepts in exercises and engineering problems.	Introduction, Flexural Analysis of Beams (working): Cracking Moment; Elastic Stresses—Concrete Cracked	Lecture, problem solving, and computer applications	Class questions and assignments
Week 3	2	Understand the topic and apply its concepts in exercises and engineering problems.	Introduction, Flexural Analysis of Beams (Ultimate): Ultimate Moment; Yield Stresses	Lecture, problem solving, and computer applications	Class questions and assignments
Week 4	2	Understand the topic and apply its concepts in exercises and engineering problems.	Strength Analysis of Beams According to ACI Code: Design Methods; Strains in Flexural Members; Balanced Sections, Tension-Controlled Sections, and Compression-Controlled.	Lecture, problem solving, and computer applications	Class questions and assignments
Week 5	2	Understand the topic and apply its concepts in exercises and engineering problems.	Design of Rectangular Beams and One-Way Slabs: Load Factors; Design of Rectangular Beams; One-Way Slabs	Lecture, problem solving, and computer applications	Class questions and assignments
Week 6	2	Understand the topic and apply its concepts in exercises and engineering problems.	Analysis and Design of T Beams and Doubly Reinforced Beams: T Beams; Design of Doubly Reinforced Beams (positive and Negative Moment design); L-Shaped Beams	Lecture, problem solving, and computer applications	Class questions and assignments
Week 7	2	Understand the topic and apply its concepts in exercises and engineering problems.	Shear and Diagonal Tension: Shear Stresses in Concrete Beams; Design for Shear.	Lecture, problem solving, and computer applications	Class questions and assignments
Week 8	2	Understand the topic and apply its concepts in exercises and engineering problems.	Introduction to columns, Flexural Analysis of short columns (under axial loads), Load carrying capacity of short columns, ties design.	Lecture, problem solving, and computer applications	Class questions and assignments
Week 9	2	Understand the topic and apply its concepts in exercises and engineering problems.	Short column under axial and bending actions, Interaction diagram (m-p curves).	Lecture, problem solving, and computer applications	Class questions and assignments
Week 10	2	Understand the topic and apply its concepts in exercises and engineering problems.	Design of short columns subjected to bending and axial loads according to ACI Code: Design Methods	Lecture, problem solving, and computer applications	Class questions and assignments
Week 11	2	Understand the topic and apply its concepts in exercises and engineering problems.	Design of flat slab with and without drop panels: Load Factors	Lecture, problem solving, and computer applications	Class questions and assignments
Week 12	2	Understand the topic and apply its concepts in exercises and engineering problems.	Design of Rectangular Beams and two-Way Slabs	Lecture, problem solving, and computer applications	Class questions and assignments
Week 13	2	Understand the topic and apply its concepts in exercises and engineering problems.	Design of footings, single, continuous and mat footings	Lecture, problem solving, and computer applications	Class questions and assignments
Week 14	2	Understand the topic and apply its concepts in exercises and engineering problems.	Procuration for seismic resistance moment frames	Lecture, problem solving, and computer applications	Class questions and assignments
Week 15	2	Understand the topic and apply its concepts in exercises and	Design and analysis real case structures using computer software	Lecture, problem solving, and computer applications	Class questions and assignments

		engineering problems.			
Week 16	2	Assess students' understanding of the previous topics.	Preparatory week before the final Exam	Lecture, problem solving, and computer applications	Exam

11. Course Evaluation

Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 4, 9, relevant learning outcome LO #1- 7 and #8- 12.
Assignments: Formative assessment, time/number 2, weight 10% (10), week due 2, 12, relevant learning outcome LO # 4 and # 10.
Projects / Lab.: Formative assessment, time/number 1, weight 5% (5), week due Continuous, relevant learning outcome All.
Report: Formative assessment, time/number 3, weight 15% (15), week due 4,8,12, relevant learning outcome LO # 4,8 and 12.
Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1-7.
Final Exam: Summative assessment, time/number 3hr, weight 50% (50), week due 16, relevant learning outcome LO # 1-13.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required Textbooks (methodological, if any)	Jack M., Russell B. (2012) "DESIGN OF REINFORCED CONCRETE", nine Edition, Wiley, ISBN: 978-1-118-12984-5, USA. (can be downloaded from the Course web page).
Main References (sources)	Jack M., Russell B. (2012) "DESIGN OF REINFORCED CONCRETE", nine Edition, Wiley, ISBN: 978-1-118-12984-5, USA. (can be downloaded from the Course web page).
Supporting Books and References Recommended (scientific journals, reports, etc.)	Gillesania, D.I.T. “FUNDAMENTALS OF CONCRETE DESIGN". Phils. DIT Gillesania, 2003. (can be downloaded from the Course web page).
Electronic References / Websites	Google Classroom

9. Soil Mechanics II (DWRE-307)

Course Description Form	
1. Course Name:	Soil Mechanics II
2. Course Code:	DWRE-307
3. Semester / Year:	Sixth / 2025-2026
4. Date of Preparation:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures, tutorials, and practical applications when needed
6. Total Study Hours / Total Units:	2 hours weekly / 5 units
7. Course Instructor Name (if more than one, mention all):	Lamyaa Najah Sunoudi
8. Course Objectives	1- The course aims to give students the knowledge to understand the theory of shear strength of the soil. 2- The issue of engineering soil problems and how to improve the soil to raise its bearing capacity, reduce subsidence, and avoid the problems of swelling and fallout, and the effects of gypsum and saline soils will also be discussed. 3- to understand the concept of lateral earth pressures of soils and retaining wall. 4-To develop problem-solving skills and understanding of foundation engineering theory through the application of techniques. To provide students with exposure to systematic methods for designing foundations. 5-To discuss and evaluate the feasibility of foundation solutions to different types of soil conditions considering the time effect on soil behavior. 6- To understand the structural design of different types of shallow foundations. 7-To Calculate the ultimate pile capacity in the sand and in clay. To calculate the ultimate pile capacity of group piles and assess pile group efficiency. To estimate settlement of single and group piles.
9. Teaching and Learning Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	2	Understand the topic and apply its concepts in exercises and engineering problems.	Introduction and general information.	Lecture and exercises	Class questions and assignments
Week 2	2	Understand the topic and apply its concepts in exercises and engineering problems.	Soil investigation and description.	Lecture and exercises	Class questions and assignments
Week 3	2	Understand the topic and apply its concepts in exercises and engineering problems.	Shear strength of the soil.	Lecture and exercises	Class questions and assignments
Week 4	2	Understand the topic and apply its concepts in exercises and engineering problems.	Shear strength of the soil.	Lecture and exercises	Class questions and assignments
Week 5	2	Understand the topic and apply its concepts in exercises and engineering problems.	Shear strength of the soil.	Lecture and exercises	Class questions and assignments
Week 6	2	Understand the topic and apply its concepts in exercises and engineering problems.	Bearing capacity of the soil.	Lecture and exercises	Class questions and assignments
Week 7	2	Understand the topic and apply its concepts in exercises and engineering problems.	Bearing capacity of the soil.	Lecture and exercises	Class questions and assignments
Week 8	2	Understand the topic and apply its concepts in exercises and engineering problems.	Bearing capacity of the soil.	Lecture and exercises	Class questions and assignments
Week 9	2	Understand the topic and apply its concepts in exercises and engineering problems.	Lateral earth pressure of the soil.	Lecture and exercises	Class questions and assignments
Week 10	2	Understand the topic and apply its concepts in exercises and engineering problems.	Lateral earth pressure of the soil.	Lecture and exercises	Class questions and assignments
Week 11	2	Understand the topic and apply its concepts in exercises and engineering problems.	Retaining walls.	Lecture and exercises	Class questions and assignments
Week 12	2	Understand the topic and apply its concepts in exercises and engineering problems.	Deep foundation.	Lecture and exercises	Class questions and assignments
Week 13	2	Understand the topic and apply its concepts in exercises and engineering problems.	Deep foundation.	Lecture and exercises	Class questions and assignments
Week 14	2	Understand the topic and apply its concepts in exercises and engineering problems.	Foundation structural design.	Lecture and exercises	Class questions and assignments
Week 15	2	Understand the topic and apply its concepts in exercises and	Foundation structural design.	Lecture and exercises	Class questions and assignments

		engineering problems.			
Week 16	2	Assess students' understanding of the previous topics.	Preparatory week before the final Exam	Lecture and exercises	Exam

11. Course Evaluation

Quizzes: Formative assessment, time/number 3, weight 10% (10), week due 4, 7, 11, relevant learning outcome LO # 1-2, 5-6, 7.
Assignments: Formative assessment, time/number 3, weight 10% (10), week due 5,8, 12, relevant learning outcome LO # 1-2, 5-6, 7.
Lab: Formative assessment, time/number 1, weight 10% (10), week due Continuous, relevant learning outcome LO # 3 and 4.
Report: Formative assessment, time/number 7, weight 10% (10), week due Every week, relevant learning outcome LO # 3-4.
Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1, 2 ,5.
Final Exam: Summative assessment, time/number 2hr, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required Textbooks (methodological, if any)	"Principles of Geotechnical Engineering",(2004), Braja M. Das, 5th edition 2002, copyright by Wadsworth Group/United Stated. "Principal of Soil Mechanic", (1991), Mohammed O. AL-Asho, (Book language in Arabic). الشكرجي ، يوسف والمحمدي، نوري، "هندسة الأسس "، جامعة بغداد ،الطبعة الاولى، 31985-.
Main References (sources)	"Principles of Geotechnical Engineering",(2004), Braja M. Das, 5th edition 2002, copyright by Wadsworth Group/United Stated. "Principal of Soil Mechanic", (1991), Mohammed O. AL-Asho, (Book language in Arabic). الشكرجي ، يوسف والمحمدي، نوري، "هندسة الأسس "، جامعة بغداد ،الطبعة الاولى، 31985-.
Supporting Books and References Recommended (scientific journals, reports, etc.)	" Elements of Soil Mechanics", (1988), G. N. Smith and Ion G. N. Smith, USA. " Problem Solving in Soil Mechanics", (2003), A. Aysen, Swets & Zeitlinger B.V. Bowles, J.E., P.E., S.E., " Foundation Analyses and Design ", The McGraw-Hill Companies, Inc, 5th ed., 2006. Peak, R. B., Hanson, W. E. and Thorburn, T.H., " Foundation Engineering ", John Wiley and Sons, 2nd ed., 1974 Das, B. M., "Principle of Foundation Engineering ", Thomson Books/Cole, California State University, Sacramento, 5th ed., 2004. 6. Das, B. M., & Sivakugan, N., " Principles of foundation engineering", Cengage learning, 2018.
Electronic References / Websites	None

10. Engineering Hydrology II (DWRE--308)

Course Description Form	
1. Course Name:	Engineering Hydrology II
2. Course Code:	DWRE--308
3. Semester / Year:	Sixth / 2025-2026
4. Date of Preparation:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures, tutorials, and practical applications when needed
6. Total Study Hours / Total Units:	2 hours weekly / 6 units
7. Course Instructor Name (if more than one, mention all):	Ruqayya Abdul-Hussein Jumaa Al-Tikriti
8. Course Objectives	Groundwater hydrology is essential for third-stage dams and water resources engineering students in order to identify the properties of artesian wells and describe the conditions under which they form; explain the difference between porosity and permeability; list and describe the properties of aquifers that control the movement and storage of groundwater; use Darcy's Law to explain the roles of aquifer properties and driving forces in governing the rate of groundwater flow; apply the concept of hydraulic head to draw flowlines on maps and cross sections; interpret the current and historical balance between groundwater recharge and water extraction from well hydrographs;
9. Teaching and Learning Strategies	The essential strategy of this module is to motivate students about applying theory of groundwater occurrence and movement; groundwater extraction, replenishment, and protection; knowing the underlying principles of methods applied to groundwater exploration and pumping tests; building numerical models for groundwater flow. Ability to use software for simulating Groundwater.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	2	Understand the topic and apply its concepts in exercises and engineering problems.	General introduction - What is Groundwater? Groundwater and the Water Cycle Groundwater aquifers in Iraq: Importance of Groundwater, Groundwater Scenario: Global Perspectives Global Mapper software.	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 2	2	Understand the topic and apply its concepts in exercises and engineering problems.	Definitions and terms: Aquifer Properties, Types of Aquifers, Confined aquifer Unconfined aquifer, Leaky aquifer, Perched Aquifers Properties of Aquifers, Porosity, Specific yield, Coefficient of permeability Global Mapper software.	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 3	2	Understand the topic and apply its concepts in exercises and engineering problems.	Groundwater movement laws: Darcy's Law, Hydraulic Conductivity, Transmissibility Excel Coding.	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 4	2	Understand the topic and apply its concepts in exercises and engineering problems.	The steady state of flow in wells: Analysis of Steady Groundwater Flow, Steady Flow in Confined Aquifers	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 5	2	Understand the topic and apply its concepts in exercises and engineering problems.	- Steady Flow in Unconfined Aquifers ,Steady Unconfined Flow without Recharge or Evapotranspiration Excel Coding	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 6	2	Understand the topic and apply its concepts in exercises and engineering problems.	Equations of Motion, Confined Groundwater Flow Confined Groundwater Flow between Two water Bodies, Unconfined Flow by Dupit's Assumption	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 7	2	Assess students' understanding of the previous topics.	First monthly exam	Lecture, problem solving, and computer applications	Exam
Week 8	2	Understand the topic and apply its concepts in exercises and engineering problems.	Hydraulics of Wells, Drawdown in Wells, Steady Flow into a Well Confined Flow-Unconfined Excel Coding	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 9	2	Understand the topic and apply its concepts in exercises and engineering problems.	Flow- Functions of Wells, Classification of Water Wells, Open Wells-Tube wells	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 10	2	Understand the topic and apply its concepts in exercises and engineering problems.	The imaginary well theory. GMS software	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 11	2	Understand the topic and apply its concepts in exercises and engineering problems.	Pumping check. Well flow near aquifer boundaries-Well flow near an Impermeable boundaries -Multiple Well System- GMS software GMS software	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 12	2	Understand the topic and apply its concepts in exercises and engineering problems.	Flow network and groundwater mapping. GMS software	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 13	2	Understand the topic and apply its concepts in exercises and engineering problems.	Well drilling- penetration speed, diameter of the bit, depth of the hole and level of vibration. GMS software	Lecture, problem solving, and computer applications	Assignments and computer applications
Week 14	2	Understand the topic and apply its	The relationship of rainfall with the groundwater	Lecture, problem solving,	Assignments and

		concepts in exercises and engineering problems.	level and data documentation. GMS software	and computer applications	computer applications
Week 15	2	Assess students' understanding of the previous topics.	Second monthly exam .	Lecture, problem solving, and computer applications	Exam
Week 16	2	Assess students' understanding of the previous topics.	The preparatory week before the Final Exam	Lecture, problem solving, and computer applications	Exam

11. Course Evaluation

First monthly Exam: Formative assessment, time/number 2 hr, weight 15% (15), week due 7, relevant learning outcome #1, 2, 3 and 4.
Second monthly Exam: Formative assessment, time/number 2hr, weight 15% (15), week due 15, relevant learning outcome # 5, 6 and 7.
Class work: Summative assessment, time/number 2 hr, weight 10% (10), week due 3,5,7,10,13, relevant learning outcome All.
Final Exam: Summative assessment, time/number 3hr, weight 60% (60), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required Textbooks (methodological, if any)	Groundwater hydrology (2005) by Todd,D.K., Mays, L. W. Wiley
Main References (sources)	Groundwater hydrology (2005) by Todd,D.K., Mays, L. W. Wiley
Supporting Books and References Recommended (scientific journals, reports, etc.)	Groundwater hydrology-Conceptual and computational Models (2003)by K.R.Rushton published by Wiley
Electronic References / Websites	https://ocw.mit.edu/courses/1-72-groundwater-hydrology-fall-2005/ https://ocw.mit.edu/courses/1-72-groundwater-hydrology-fall-2005/pages/lecture-notes/

11. Irrigation Engineering and Practices (DWRE-309)

Course Description Form	
1. Course Name:	Irrigation Engineering and Practices
2. Course Code:	DWRE-309
3. Semester / Year:	Sixth / 2025-2026
4. Date of Preparation:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures, tutorials, and practical applications when needed
6. Total Study Hours / Total Units:	3 hours weekly / 5 units
7. Course Instructor Name (if more than one, mention all):	Sinan Noori Fayhan Mahmoud
8. Course Objectives	1. To understand Irrigation – world wide 2. To understand Sources and storage of Irrigation water 3. To understand the Basic soil-water relations 4. To understand the Flow of water onto and through soils. 5. To understand the Measurement of soil moisture. 6. To understand the Irrigation water conveyance.
9. Teaching and Learning Strategies	Through this course, we try to help the student to understand the foundations of the irrigation process by learning everything related to irrigation water sources, and methods of ancient and modern irrigation, as well as linking the relationship between soil and water, and how water moves over and through the soil, while giving the student examples of all this from reality, with reference to The major irrigation projects in the city and the country and the irrigation methods used in each of them.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	3	Understand the topic and apply its concepts in exercises and engineering problems.	Irrigation in the world - irrigation since ancient times - dry areas in the world - definition of irrigation - precipitation - flood water - ground water	Lecture and exercises	Class questions and assignments
Week 2	3	Understand the topic and apply its concepts in exercises and engineering problems.	The Future of Growth and Expansion in Irrigation - Fields of Irrigation Science - Irrigation Economics	Lecture and exercises	Class questions and assignments
Week 3	3	Understand the topic and apply its concepts in exercises and engineering problems.	Irrigation water sources and storage - rainfall on valleys - studies of water resources - surveys in snowy areas and their benefits - surface reservoirs	Lecture and exercises	Class questions and assignments
Week 4	3	Understand the topic and apply its concepts in exercises and engineering problems.	Small dams - sedimentation (accumulation of sediments) in reservoirs - reduction of evaporation losses - problems of aquatic (aquatic plants) - industrial rain or sowing of clouds - development of river pumping	Lecture and exercises	Class questions and assignments
Week 5	3	Understand the topic and apply its concepts in exercises and engineering problems.	Transferring saline water to fresh water - Importance of ground water (groundwater) - Feeding or recharging aquifers - Safe disposal of underground irrigation tanks	Lecture and exercises	Class questions and assignments
Week 6	3	Understand the topic and apply its concepts in exercises and engineering problems.	Feasibility of groundwater development - changes in groundwater storage - groundwater studies and research	Lecture and exercises	Class questions and assignments
Week 7	3	Understand the topic and apply its concepts in exercises and engineering problems.	Soil and soil basic relationships - soil texture - soil structure (soil construction) - specific gravity (real weight) - specific weight	Lecture and exercises	Class questions and assignments
Week 8	3	Understand the topic and apply its concepts in exercises and engineering problems.	Pore space - leaching - soil water input - permeability - soil depth - plant food compounds - soluble excess salts	Lecture and exercises	Class questions and assignments
Week 9	3	Understand the topic and apply its concepts in exercises and engineering problems.	Surface tension - Tensile stresses (tension compressors) - Soil moisture stress - Soil moisture content - Soil water classification and availability (availability)	Lecture and exercises	Class questions and assignments
Week 10	3	Understand the topic and apply its concepts in exercises and engineering problems.	Fill the available ground water tank - the natural properties represented by the soil	Lecture and exercises	Class questions and assignments
Week 11	3	Understand the topic and apply its concepts in exercises and engineering problems.	Soil moisture measurement - Drilling of soil for soil samples - Soil resistance for penetration - Appearance and texture of soil as evidence of moisture content	Lecture and exercises	Class questions and assignments
Week 12	3	Understand the topic and apply its concepts in exercises and engineering problems.	Determination of moisture content of soil by weight method - Exploitation of electrical properties of porous mold - Tensiometers - Neutron method for soil moisture measurement - Thermal properties - Error in sample	Lecture and exercises	Class questions and assignments
Week 13	3	Understand the topic and apply its concepts in exercises and engineering problems.	Flow of water in and through soil - Energy in flowing water - Bases to measure pressure energies in saturated soil - Measuring soil permeability	Lecture and exercises	Class questions and assignments
Week 14	3	Understand the topic and apply its concepts in exercises and engineering problems.	Characteristics of soil water input (absorption) - Constant pressure permeability meter - Variable pressure permeability meter - Input rate measurement (soil absorption of water) - Precipitation and movement of soil water during irrigation - Asymmetric and non-homogeneous soil in all directions -	Lecture and exercises	Class questions and assignments

Week 15	3	Understand the topic and apply its concepts in exercises and engineering problems.	Salinity problem in soil - Climate and salinity - Sources of soluble salts and their accumulation - Use of salt water in irrigation - Criteria for irrigation water validity	Lecture and exercises	Class questions and assignments
Week 16	3	Assess students' understanding of the previous topics.	Preparatory week before the final Exam	Lecture and exercises	Exam

11. Course Evaluation

Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, relevant learning outcome LO #1, 2, 10 and 11.
Assignments: Formative assessment, time/number 2, weight 10% (10), week due 2, 12, relevant learning outcome LO # 3, 4, 6 and 7.
Projects / Lab.: Formative assessment, time/number 1, weight 5% (5), week due Continuous, relevant learning outcome All.
Report: Formative assessment, time/number 3, weight 15% (15), week due 4,8,12, relevant learning outcome LO # 5, 8 and 10.
Midterm Exam: Summative assessment, time/number 2 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1-7.
Final Exam: Summative assessment, time/number 3hr, weight 50% (50), week due 16, relevant learning outcome All.
Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources

Required Textbooks (methodological, if any)	- Irrigation principles and practices , by V.E. Hansen ,O.W.Israelsen and G.F. Stringham, fourth edition, john wiley and sons., 1980.
Main References (sources)	- Irrigation principles and practices , by V.E. Hansen ,O.W.Israelsen and G.F. Stringham, fourth edition, john wiley and sons., 1980.
Supporting Books and References Recommended (scientific journals, reports, etc.)	-Design manual for irrigation &drainage- ministry of irrigation-Iraq (pencol)
Electronic References / Websites	None

12. Hydraulics of pipeline systems (DWRE-310)

Course Description Form

1. Course Name:	Hydraulics of pipeline systems
2. Course Code:	DWRE-310
3. Semester / Year:	Sixth / 2025-2026
4. Date of Preparation:	1/11/2025
5. Available Attendance Forms:	Theoretical lectures, tutorials, and practical applications when needed
6. Total Study Hours / Total Units:	3 hours weekly / 5 units
7. Course Instructor Name (if more than one, mention all):	Asmaa Abdul-Jabbar Jameel Mahdi
8. Course Objectives	This module aims to provide undergraduate students with fundamental knowledge and applied skills for the hydraulic analysis and preliminary design of pressurized pipeline systems and simple distribution networks. Emphasis is placed on steady-state flow, pressure distribution, diameter selection using head loss/velocity criteria, and the role of pipeline appurtenances.
9. Teaching and Learning Strategies	Lectures using board derivations & visual aids Guided problem-solving tutorials Short applied assignments from real pipeline systems Group discussion on case studies Spreadsheet-based simple network balancing Continuous formative feedback

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	3	Understand the topic and apply its concepts in exercises and engineering problems.	Course introduction, pipeline system types	Lecture, problem solving, and computer applications	Class questions and assignments
Week 2	3	Understand the topic and apply its concepts in exercises and engineering problems.	Governing equations: continuity & system energy	Lecture, problem solving, and computer applications	Class questions and assignments
Week 3	3	Understand the topic and apply its concepts in exercises and engineering problems.	Pipeline profile, topography effect	Lecture, problem solving, and computer applications	Class questions and assignments
Week 4	3	Understand the topic and apply its concepts in exercises and engineering problems.	Hydraulic Grade Line (HGL) introduction	Lecture, problem solving, and computer applications	Class questions and assignments
Week 5	3	Understand the topic and apply its concepts in exercises and engineering problems.	Energy Grade Line (EGL) & pressure interpretation	Lecture, problem solving, and computer applications	Class questions and assignments
Week 6	3	Understand the topic and apply its concepts in exercises and engineering problems.	Acceptable velocity ranges & velocity constraints	Lecture, problem solving, and computer applications	Class questions and assignments
Week 7	3	Understand the topic and apply its concepts in exercises and engineering problems.	Headloss buildup in long pipelines	Lecture, problem solving, and computer applications	Class questions and assignments
Week 8	3	Assess students' understanding of the previous topics.	Midterm Exam	Lecture, problem solving, and computer applications	Exam
Week 9	3	Understand the topic and apply its concepts in exercises and engineering problems.	Diameter selection	Lecture, problem solving, and computer applications	Class questions and assignments
Week 10	3	Understand the topic and apply its concepts in exercises and engineering problems.	Simple branching network behavior	Lecture, problem solving, and computer applications	Class questions and assignments
Week 11	3	Understand the topic and apply its concepts in exercises and engineering problems.	Intro to looped network balancing	Lecture, problem solving, and computer applications	Class questions and assignments
Week 12	3	Understand the topic and apply its concepts in exercises and engineering problems.	Roughness aging & calibration concepts	Lecture, problem solving, and computer applications	Class questions and assignments
Week 13	3	Understand the topic and apply its concepts in exercises and engineering problems.	Operational issues: air pockets & dead ends	Lecture, problem solving, and computer applications	Class questions and assignments
Week 14	3	Understand the topic and apply its concepts in exercises and engineering problems.	Pipeline appurtenances & placement logic	Lecture, problem solving, and computer applications	Class questions and assignments
Week 15	3	Understand the topic and apply its concepts in exercises and engineering problems.	System performance evaluation & pressure criteria	Lecture, problem solving, and computer applications	Class questions and assignments
Week 16	3	Assess students' understanding of the previous topics.	Preparatory week before the final Exam	Lecture, problem solving, and computer applications	Exam

11. Course Evaluation

Quizzes: Formative assessment, time/number 2, weight 10% (10), week due 5, 10, relevant learning outcome LO #1, 2, 10 and 11.
Assignments: Formative assessment, time/number 2, weight 10% (10), week due 2, 12, relevant learning outcome LO # 3, 4, 6 and 7.
Projects / Lab.: Formative assessment, time/number 1, weight 10% (10), week due Continuous, relevant learning outcome All.
Report: Formative assessment, time/number 1, weight 10% (10), week due 13, relevant learning outcome LO # 5, 8 and 10.
Midterm Exam: Summative assessment, time/number 1 hr, weight 10% (10), week due 7, relevant learning outcome LO # 1-7.

Final Exam: Summative assessment, time/number 3hr, weight 50% (50), week due 16, relevant learning outcome All. Total assessment: 100% (100 Marks).

12. Learning and Teaching Resources	
Required Textbooks (methodological, if any)	Larock, B. E., Jeppson, R. W., & Watters, G. Z. Hydraulics of Pipeline Systems. CRC Press.
Main References (sources)	Larock, B. E., Jeppson, R. W., & Watters, G. Z. Hydraulics of Pipeline Systems. CRC Press.
Supporting Books and References Recommended (scientific journals, reports, etc.)	Wurbs, R. A., & James, W. P. (2002). Water Resources Engineering.
Electronic References / Websites	None

Fourth Stage Course Descriptions
Dams and Water Resources Engineering Department
Tikrit University

No.	Module Code	Module Title	Arabic Title	Semester	ECTS	SWL	Type
1	DWRE-401	Hydraulic Structures I	المنشآت الهيدروليكية I	Seven	6	150	C
2	DWRE-402	Foundations Engineering	هندسة الاسس	Seven	5	125	B
3	DWRE-403	Methods of Construction and Estimation	تخمين وطرق انشاء	Seven	4	100	B
4	DWRE-404	Drainage Engineering and Practices	هندسة البزل وتطبيقاته	Seven	4	100	C
5	DWRE-405	Graduation Project I	مشروع تخرج I	Seven	6	150	C
6	DWRE-406	Hydraulic Structures II	المنشآت الهيدروليكية II	Eight	6	150	C
7	DWRE-407	Rivers Engineering	هندسة الانهار	Eight	5	125	C
8	DWRE-408	Dams and Reservoirs Engineering	هندسة السدود والخزانات	Eight	5	125	C
9	DWRE-409	Sanitary Engineering	الهندسة الصحية	Eight	4	100	C
10	DWRE-410	Graduation Project II	مشروع تخرج II	Eight	6	150	C

1. Hydraulic Structures I (DWRE-401)

Module Information | معلومات المادة الدراسية		
Module Title	Hydraulic Structures I	
Arabic Module Title	المنشآت الهيدروليكية I	
Module Code	DWRE-401	
Module Type	C	
ECTS Credits	6	
SWL (hr/sem)	150	
Module Level	4	
Semester	Seven	
Language	English	
7. Course Instructor Name (if more than one, mention all):	Mohammed Faeq Yas Khudair	
Prerequisite module	None	
Relation with other Modules **العلاقة مع المواد الدراسية الأخرى**		
Prerequisite module	None	Semester
Co-requisites module	None	Semester
Module Aims, Learning Outcomes and Indicative Contents **أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية**		
Module Aims **أهداف المادة الدراسية**	To understand and classify the hydraulic structures and their uses. To understand the behavior of water seepage under hydraulic structures and develop the ability to compute the creep line and uplift pressure using different methods. To perform the design steps of some types of stilling basin structures. To understand the water diversion works and perform the head and cross regulator design steps.	
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	Classify the hydraulic structures and their uses, Recognize problems accompanying water seepage under the hydraulic structures, Apply the basic concepts of engineering to calculate seepage and uplift pressure under different hydraulic structures, Develop and solve design problems and analyze the data to evaluate the feasibility of components of some types of stilling basin and head and cross regulator,	

	Evaluate and analyze the safety of the head and cross regulator, Demonstrate the ability to lead and productively participate in group situations by assigning multidisciplinary design projects for some hydraulic structures.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. Introduction of the hydraulic structures. Some theories for estimating the uplift pressure and piping phenomena in hydraulic structures Bligh's theory, Lane's theory, Khosla's theory, and Flow net analysis. [25 hrs] Protection works of approaches for the horizontal floor. [5 hrs] Introduction of a hydraulic jump, its types, efficiency, length, position, and tailwater conditions. [5 hrs] Stilling basins. Introduction Design of R.S.Varshney stilling basin Design of SAF stilling basin, and U.S.B.R II stilling basin. [15 hrs] Cross regulator and head regulator. Introduction and design steps of the cross regulator and head regulator. Design example Apply example [25 hrs]

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	The primary strategy that will be adopted in delivering this module is to encourage students' participation in classes, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials, and practical designing of the hydraulic structures. Power point presentations and boards are used in the classroom. Examples and problems will be solved and illustrated on the classroom board. Tutorials are also organized to establish closer contact with students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1					
Week 1	4	Identify the types, functions, and applications of hydraulic structures.	Introduction to Hydraulic Structures	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 2	4	Understand uplift pressure and apply Bligh's theory in hydraulic structure design.	Uplift Pressure and Bligh's Theory with a Design Example	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 3	4	Analyze seepage flow using flow nets and apply Lane's theory.	Lane's Theory and Flow Net Analysis	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 4	4	Apply Khosla's theory and evaluate exit gradient for hydraulic structures.	Khosla's Theory and Exit Gradient	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 5	4	Perform design calculations using Khosla's theory for practical cases.	Design Example Using Khosla's Theory	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 6	4	Design protective works for horizontal floors against scour and erosion.	Protection Works for Horizontal Floors	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 7	4	Assess students' understanding of first-half course topics and hydraulic jump concepts.	Midterm Examination and Hydraulic Jump	Lecture, computer applications, and problem-solving	Midterm Examination
Week 8	4	Design stilling basins using the R.S.	R.S. Varshney Stilling Basin with Example	Lecture, computer	Class activities and

		Varshney method.		applications, and problem-solving	assignments
Week 9	4	Design stilling basins using the SAF method.	SAF Stilling Basin with Example	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 10	4	Design stilling basins according to U.S.B.R. II criteria.	U.S.B.R. II Stilling Basin with Example	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 11	4	Recognize regulator types and the design procedures of cross and head regulators.	Introduction and Design Procedures of Cross and Head Regulators	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 12	4	Apply engineering calculations in the design of cross and head regulators.	Design Example of Cross and Head Regulators	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 13	4	Complete the design process and verify the efficiency and safety of the structure.	Completion of Design Example	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 14	4	Analyze final design results and perform necessary revisions.	Completion of Design Example	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 15	4	Review all course topics and prepare for the final examination.	General Review	Lecture, discussion, and problem-solving	Exam Preparation

Learning and Teaching Resources **مصادر التعلم والتدريس**	Text	Available in the Library?
Required Texts	Varshney, R.S., Gupta, S. C., Gupta, R. L., (1979) "Theory & design of irrigation structures". Nem Chand & Bros; Roorkee, India.	Yes
Recommended Texts	Asawa, G. L. (2008) "Irrigation and Water Resources Engineering" New Age International(P) Limited, Publishers. Chanson, Hubert., (2004) "The Hydraulics of Open Channel Flow: An Introduction" Elsevier. Chow, Ven te., (1959) "Open Channels Hydraulics" Mc Graw Hill.	No

2. Foundations Engineering (DWRE-402)

Module Information | معلومات المادة الدراسية			
Module Title		Foundations Engineering	
Arabic Module Title		هندسة الاسس	
Module Code		DWRE-402	
Module Type		B	
ECTS Credits		5	
SWL (hr/sem)		125	
Module Level		4	
Semester		Seven	
7. Course Instructor Name (if more than one, mention all):		Firas Hazem Jasim Mohammed	
Language		English	
Prerequisite module		None	
Relation With Other Modules **العلاقة مع المواد الدراسية الأخرى**			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description			

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	Foundation engineers aim to comprehend the behavior of soil and its interaction with structures by performing a suitable geotechnical site investigation. This includes studying soil properties, such as strength, stiffness, compressibility, and permeability, to assess their influence on foundation design. Foundation engineers assess the bearing capacity of soil, which refers to its ability to support the applied loads from a structure without excessive settlement or failure. The aim is to ensure that the foundation has an adequate bearing capacity to safely support the structure's loads. Estimate the settlement occurs when a foundation undergoes vertical displacement due to soil compression or consolidation. Foundation engineers aim to minimize and control settlement through proper foundation design, including selecting appropriate foundation types, distributing loads, and considering soil improvement techniques.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Ability to perform geotechnical site investigations. 2- Assessing the bearing capacity of soil to ensure that the foundation has an adequate bearing capacity to safely support the structure's loads. 3- Students can be able to analyze and evaluate the performance of foundations, including assessing settlement, stability, and bearing capacity issues. 4- Students can develop problem-solving and critical thinking skills to identify, analyze, and solve geotechnical engineering problems related to foundation design. 5- Students can be able to effectively communicate their ideas, design solutions, and analysis results through written reports, drawings, and oral presentations. They should also develop the ability to work collaboratively in multidisciplinary teams.		
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Site investigations (20 hrs) Bearing capacity (30 hrs) Stresses in soil mass (10 hrs) Settlement of buildings (28 hrs)		
Course Description	Foundation Engineering-I, are provided to deal with soil exploration method to investigate the underground soil physical and mechanical properties and conducting field tests. Calculating the bearing capacity of soil by various methods, estimating stress distribution through soil media to estimate all components of settlements that may occur due to loading coming from superstructure		
Learning and Teaching Strategies استراتيجيات التعلم والتعليم			
Strategies	Clearly communicate the module's learning outcomes and objectives to students at the beginning. This will provide them with a clear understanding of what they are expected to learn and achieve throughout the module. Incorporate active learning strategies to engage students actively in the learning process. This can include group discussions, problem-solving activities, case studies, and interactive simulations. Encourage students to actively participate and apply their knowledge to real-world scenarios. Visual representations can help students grasp complex concepts and make connections between theory and practical applications. Incorporate real-world examples and case studies of foundation engineering projects to demonstrate the application of theoretical concepts.		

Module Evaluation تقييم المادة الدراسية					
As	Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome	
Formative assessment	Quizzes	2	10% (10)	3, 7, 11, 14	LO #1, 2, and 3
Formative assessment	Assignments	6	18% (18)	2, 4, 6, , 9, 13	LO # 1, 2, 3 and 4
Formative assessment	Case study reports	4	12% (12)	Continuous	
Summative assessment	Midterm Exam	1.5	10% (10)	8	LO # 1-2
Summative assessment	Final Exam	3	50% (50)	16	All
Total assessment	100% (100 Marks)				

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	4	Understand the principles of quantity estimation and project planning in construction engineering.	Introduction to Estimation and Planning	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 2	4	Calculate quantities, dimensions, and project requirements accurately.	Quantity and Dimension Estimation	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 3	4	Apply engineering estimation methods to construction projects.	Estimation Applications	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 4	4	Conduct site investigations and evaluate field conditions for construction projects.	Site Investigations	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 5	4	Analyze the impact of labor, equipment, and safety requirements on project execution.	Labor, Equipment, and Safety Requirements	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 6	4	Determine appropriate construction methods and project implementation procedures.	Construction Methods	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 7	4	Evaluate the effects of soil conditions and environmental factors on construction activities.	Effects of Soil Conditions	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 8	4	Assess students' understanding of first-half course topics.	Midterm Examination	Written Examination	Examination
Week 9	4	Apply practical estimation techniques to engineering projects.	Estimation Applications	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 10	4	Calculate project schedules and resource requirements.	Scheduling and Resource Allocation	Lecture, computer applications, and problem-solving	Class activities and assignments

Week 11	4	Estimate project costs and prepare budget analyses.	Cost Estimation	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 12	4	Design site layouts and organize construction operations efficiently.	Site Layout Design	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 13	4	Apply construction management principles to practical engineering cases.	Practical Applications	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 14	4	Analyze real construction projects and evaluate implementation strategies.	Case Studies in Construction Management	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 15	4	Review all course topics and prepare for the final examination.	General Review	Lecture, discussion, and review session	Exam Preparation
Week 16	4	Demonstrate comprehensive understanding of estimation and construction methods.	Final Examination	Final Examination	Final Examination

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	Available in the Library?
Required Texts	Bowles, J.E., 1996. Foundation analysis and design. McGraw-Hill.	Yes
Recommended Texts	Das, B.M., 2017. Shallow foundations: bearing capacity and settlement. CRC press.	Yes

3. Methods of Construction and Estimation (DWRE-403)

Module Information | معلومات المادة الدراسية	
Module Title	Methods of Construction and Estimation
Arabic Module Title	تخمين وطرق انشاء
Module Code	DWRE-403
Module Type	B
ECTS Credits	4
SWL (hr/sem)	100
Module Level	4
Semester	Seven
Course Instructor Name (if more than one, mention all):	Yasser Mowafaq Ali
Language	Arabic
Prerequisite module	None

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**	Enabling students to develop a comprehensive understanding of the value engineering methodology, types of contracts, how to deal and the interrelationship between engineering contracts, referral methods, how to find the costs of owning and operating engineering equipment, the physical factors affecting the work of equipment, determining the productivity of some construction equipment, the productivity of concrete, how to design molds and Introducing students to the most important ethical problems that threaten their work and ways to solve them in addition to the following: Learn the basics of estimation and its types. To understand the constructional paragraphs of the facilities. Studying the various methods used to estimate the quantities of materials used in construction. To learn how to calculate works cost. This course deals with clarifying the basic concepts of Analysis Reinforced of slabs and beams. Learn the basics of structural drawing. Learn the basics of designing and reading engineering plans
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Introducing the student to the engineering equipment and the factors affecting it, and calculating the costs of owning and operating. 2. Introducing the student to the physiologic factors that affect the work of engineering equipment. 3. Introducing the student to the trailers, their specifications and method of work. 4. Excavation and Foundations stripe and raft calculations. 5. Wall building works and estimation of Block, bricks and stone. 6. Identify the wooden template. 7. Analysis Reinforced of slabs and beams. 8. Calculation of the amount of concrete. 9. Design and Draw (Map of house+ foundation map+ section in wall). 10. Design and Draw (home electrical network). 11. Design and Draw (home sewage networks). 12. Design and Draw (the Electrical network in house). 13. Design and Analysis of Finishing works
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. Introduction to Estimation and Specifications, Estimation types definitions, Introduction of Structural drawing [7 hrs]. Excavation of stripe and raft foundation [8 hrs]. Estimation of (cement, sand, gravel) for stripe and raft foundation, Estimation of steel reinforced, Estimation of steel reinforced for stripe and raft foundation [20hrs]. walls building works and estimation of materials, stone building, Bricks building, Block building [20 hrs]. Estimation of materials for wood form types [8 hrs] Estimation of materials for reinforced of slab, Reinforced of beams, Estimation of materials for finishing works [15 hrs].
Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) **الحمل الدراسي للطالب**			
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	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.47
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	2	10% (10)	5, 10	LO #1, 2 and 3, 5
Formative assessment	Assignments	2	10% (10)	2, 12	LO # 4 and 6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	
Formative assessment	Report	1	10% (10)	13	LO # 7 and 8
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-9
Summative assessment	Final Exam	2hr	50% (50)	16	All
Total assessment	100% (100 Marks)				

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method

Week 1	3	Understand construction methods, quantity estimation, and project planning principles.	Introduction to Construction Methods, Estimation, and Planning	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 2	3	Identify survey works and methods used in construction projects.	Survey Works and Site Preparation	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 3	3	Apply surveying techniques in engineering projects.	Applications of Surveying Works	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 4	3	Perform required field investigations and site assessments.	Site Investigations	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 5	3	Calculate quantities and estimate project requirements accurately.	Quantity Estimation	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 6	3	Determine project specifications and select appropriate equipment.	Specification Identification and Equipment Selection	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 7	3	Evaluate the effects of soil conditions and weather on construction activities.	Midterm Examination	Lecture, computer applications, and problem-solving	Midterm Examination
Week 8	3	Identify construction equipment and their applications.	Construction Equipment and Their Uses	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 9	3	Analyze construction costs and economic considerations.	Cost Analysis	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 10	3	Estimate direct and indirect project costs.	Direct and Indirect Cost Estimation	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 11	3	Prepare project schedules using appropriate planning techniques.	Scheduling Methods	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 12	3	Design and interpret site layout plans.	Site Layout Design	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 13	3	Apply engineering specifications and contract requirements in projects.	Specifications and Contracts	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 14	3	Evaluate practical construction cases and project management applications.	Practical Applications in Construction Management	Lecture, computer applications, and problem-solving	Class activities and assignments
Week	3	Review and integrate	General Review	Lecture,	Exam

15		course concepts in preparation for the final examination.		discussion, and problem-solving	Preparation
Week 16	3	Demonstrate mastery of construction methods, estimation, and planning concepts.	Final Examination	Final Examination	Final Examination

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	VANZIRANI, V.N., CHANDOLA, S.P. "Civil Engineering Estimating and Costing ". first edition, 1982	Yes
Recommended Texts	Civil Engineering and Costing, S.P. Mahajan, 624. 1042, M214.	No
Websites	https://www.scribd.com/doc/263166656	

4. Drainage Engineering and Practices (DWRE-404)

Module Information | معلومات المادة الدراسية	
Module Title	Drainage Engineering and Practices
Arabic Module Title	هندسة البزل وتطبيقاته
Module Code	DWRE-404
Module Type	C
ECTS Credits	4
SWL (hr/sem)	100
Module Level	4
Semester	Seven
Course Instructor Name (if more than one, mention all):	Omar Taher Nafea Yousif
Language	Arabic
Prerequisite module	None

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims **أهداف المادة الدراسية**	To introduce the students to the agricultural drainage required to enhance the field production, and to create a balance among water, air, and salts contents in the soil. To learn general principles of groundwater hydraulics such as Darcy's law, Dupuit-Forchheimer method, and groundwater flow in layered soils. To manage and reclaim the saline soils by leaching To investigate drainage projects. To evaluate soil hydraulic conductivity in field and in laboratory. To understand different types of drainage systems and their planning. To design the cross-section of surface and subsurface drains. To choose the proper distance between drains. To understand the vertical drainage. To maintain drainage systems. To understand the effect of drainage on environment.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	The Drainage Engineering course teaches students a lot of useful things in designing and understanding drainage networks. After completing this course, students are supposed to be familiar with the following points: Definition of drainage, its purpose, evidence and benefits, as well as an overview of the history of drainage in Iraq. Learn the basics of groundwater movement by studying Darcy's law, Laplace's equation, and Dupuis-Forchheimer's equation. Learn about the reclamation of saline soils, salts removal, and the requirements for leaching them. Learn the exploratory and design investigations of drainage projects. Studying the various methods used to estimate the hydraulic conductivity of soils in the laboratory and field. Identifying the different drainage systems through their types, planning their locations and depths, and designing filters. Learn the basics of designing surface (open) and subsurface (covered) drainage sections. Designing the distances between the drains in the case of stable and unstable flow. Identifying the vertical drainage (drainage wells). Learn drainage maintenance. The relationship between drainage and environmental pollution.

Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following: General introduction on drainage of agricultural lands Definition of drainage, purpose of drainage, evidences of drainage problems, drainage benefits, drainage in Iraq, and sources of excess water in soil. [5 hrs] Principles of groundwater hydraulics Introduction, Law of energy conservation, groundwater potential, Darcy's law, Law of mass conservation, Laplace's equation, and Dupuit-Forchheimer equation. [10 hrs] Reclamation of saline soils The origin and nature of saline soils, Factors helping to increase the concentration of salts in agricultural soils, distribution and movement of salts in soil, the critical depth of groundwater, classification of saline soils, reclamation methods of saline soils, and soil leaching and leaching requirements. [10 hrs] Drainage projects' investigations Exploratory investigations, design investigations, and groundwater investigations. [5 hrs] Estimation of soil hydraulic conductivity Introduction, laboratory methods of soil hydraulic conductivity estimation, and field methods of soil hydraulic conductivity estimation. [10 hrs] Drainage systems Introduction, types of drainage networks, planning drains' positions, patterns of drainage network distribution, drain depths, accompanying works to subsurface drainage network, and filters (envelopes). [5 hrs] Design of drains' sections Introduction, drainage coefficient, design of open drains' sections, and design of pipe drains diameters. [5 hrs] Spacing between drains Introduction, equations used in specifying drains' spacing, equations based on steady-state flow condition, and equations based on unsteady-state flow condition. [15 hrs] Vertical drainage (drainage wells) Introduction, types of drainage wells, advantages of vertical drainage, disadvantages of vertical drainage, groundwater flow towards drainage walls, and overlapping among drainage wells. [5 hrs] Drains' maintenance Introduction, maintenance of open drains, maintenance of buried drains, and maintenance of drainage wells. Drainage and water pollution Introduction, effect of return water on domestic water uses, effect of return water on industrial water uses, effect of return water on fish water life, effect of return water on entertainment water uses, and methods of return water controlling. [5 hrs]

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

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ 15 اسبوعا**			
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	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.47
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	4	16% (16)	5, 10	LO #1 – 8
Formative assessment	Assignments	7	16% (16)	2, 12	LO #2, 3, 5 – 9
Formative assessment	Lab.	1	8% (8)	5 & 13	LO #3, 8
Summative assessment	Midterm Exam	2 hr	10% (10)	10	LO #1-7
Summative assessment	Final Exam	3 hr	50% (50)	16	All
Total assessment	100% (100 Marks)				

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	3	Understand the concept, objectives, and importance of drainage engineering.	Introduction to Drainage Engineering	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 2	3	Identify the causes and effects of excess water in agricultural lands.	Excess Water	Lecture, computer applications, and	Class activities and assignments

				problem-solving	
Week 3	3	Analyze soil salinity problems and their impact on agricultural productivity.	Soil Salinity Problems and Their Effects	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 4	3	Understand waterlogging problems and methods of control.	Waterlogging	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 5	3	Distinguish between different drainage systems and their applications.	Drainage Systems	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 6	3	Evaluate soil characteristics affecting drainage design.	Soil Properties Affecting Drainage	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 7	3	Assess students' understanding of the first-half course topics.	Midterm Examination	Lecture, computer applications, and problem-solving	Midterm Examination
Week 8	3	Apply drainage design equations to engineering problems.	Drainage Design Equations	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 9	3	Determine appropriate spacing between drainage lines.	Determination of Drain Spacing	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 10	3	Design drainage systems under steady-state conditions.	Steady-State Drainage Design	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 11	3	Design drainage systems under unsteady-state conditions.	Unsteady-State Drainage Design	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 12	3	Implement drainage design procedures using engineering calculations.	Execution of Drainage Design	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 13	3	Evaluate the efficiency and performance of drainage networks.	Evaluation of Drainage Networks	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 14	3	Analyze practical drainage engineering case studies.	Practical Applications	Lecture, computer applications, and problem-solving	Class activities and assignments
Week 15	3	Review and integrate course concepts in preparation for the final examination.	General Review	Lecture, discussion, and problem-solving	Exam Preparation
Week 16	3	Demonstrate mastery of drainage engineering principles and design procedures.	Final Examination	Final Examination	Final Examination

5. Graduation Project I (DWRE-405)

Module Information | معلومات المادة الدراسية	
Module Title	Graduation Project I
Arabic Module Title	مشروع تخرج I
Module Code	DWRE-405
Module Type	C
ECTS Credits	6
SWL (hr/sem)	150
Module Level	4
Semester	Seven
Course Instructor Name (if more than one, mention all):	
Language	English
Prerequisite module	None

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 purpose of the Graduation Project is to assure/ascertain that the students have acquired the skills, knowledge, and concepts necessary to perform well when they leave the university. Each student will use educational tools to broaden his/her knowledge about a particular, self-selected topic. Students are also expected to show how proficient they are in solving real-world problems with certain constraints for the outcome-based evaluation by the review board.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	On successful completion of this course, students will be able to: LO1. Understand and apply the fundamentals of engineering-design practices and procedures LO 2. Participate in teamwork activities. LO 3. Implement the techniques of oral and written presentations. LO 4. Identify an engineering problem and assess alternative solutions. LO 5. Apply project management fundamentals. LO 6. Understand the ethics of the engineering profession and water resources engineering issues. LO 7. Interact with industry and related non-governmental organizations.
Indicative Contents **المحتويات الإرشادية**	The graduation project will be a meaningful experience that provides a student with the opportunity for in-depth learning about a selected topic. The purpose of the project is to assure that the student is able to apply, analyze, synthesize, and evaluate information and communicate significant knowledge and understanding through a presentation. The project will be under the guidance and direction of the dept. faculty/administrators and will be assessed by an evaluation team.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Technical Report - Literature Review and Analysis - Project Problem Formulation and Solutions (Goals) - Report Organization - According to the template of the department Methodology and Procedures - Design - Implementation - Testing Individual Student Evaluation - Individual Contribution - Oral Presentation - Team Work Individual Student Evaluation by the Supervisor - Individual Contribution - Student Commitment - Team Work.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 اسبوعا			
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	102	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.8
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	Supervisor evaluation		40%(50)		All

Formative assessment					
Formative assessment					
Formative assessment					
Summative assessment					
Summative assessment	Presentation	2hr	50% (50)	16	All
Total assessment	100% (100)Marks)				

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	Available in the Library?
Required Texts	Graduation project writing instructions template تعليمات كتابة مشروع التخرج	No
Recommended Texts		No

6. Hydraulic Structures II (DWRE-406)

Module Information | معلومات المادة الدراسية	
Module Title	Hydraulic Structures II
Arabic Module Title	المنشآت الهيدروليكية II
Module Code	DWRE-406
Module Type	C
ECTS Credits	6
SWL (hr/sem)	150
Module Level	4
Semester	Eight
Course Instructor Name (if more than one, mention all):	Raad Hubi Arzuqi Jasim
Language	English
Prerequisite module	DWRE-401

Relation with other Modules **العلاقة مع المواد الدراسية الأخرى**			
Prerequisite module	DWRE 401	Semester	7
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents **أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية**	
Module Aims **أهداف المادة الدراسية**	To understand the canal headwork, and its use, and perform barrage design steps. To understand the importance of using channel transitions and develop the ability to design a transition. To ability to design a syphon structure (as a sample of cross drainage works). To understand and ability to design some hydraulic structures (culverts and Sharda-type falls).
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	Recognize the common methods of calculating seepage and uplift pressure under different hydraulic structures, Apply the basic concepts of engineering to design the required hydraulic structures' floor thickness, Formulate preliminary hydraulic design steps for some hydraulic structures, Develop and solve design problems and analyze the data to evaluate the feasibility of components of the canal Head works (barrage types), some types of flow transition, cross drainage works, and culverts, Evaluate and analyze the safety of the canal Head works structure (barrage types) and culvert, Demonstrate the ability to lead and productively participate in group situations via assigning multidisciplinary design projects for some of the hydraulic structures.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. Canal Headworks (barrage types) Introduction. Defining the components of the barrage Design steps of the undersluice, other barrages, and side main canal. [35 hrs] Transitions Introduction of transitions (R.S Chaturvedi's, Mitra's, and Hind's transitions). Design of transitions (Hind's transitions). [10 hrs]. Cross drainage works. Syphon design. [10 hrs]. Culvert. Introduction and design example of the culvert. [10 hrs]. Design of canal falls (Sharda-type fall). [10 hrs].

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	The primary strategy that will be adopted in delivering this module is to encourage students' participation in classes, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials, and practical designing of the hydraulic structures. Power point presentations and boards are used in the classroom. Examples and problems will be solved and illustrated on the classroom board. Tutorials are also organized to establish closer contact with students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 اسبوعا			
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	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	4	Identify the types, functions, and applications of canal intake structures.	Introduction to Canal Intake Structures	Theoretical lecture	Classroom questions
Week 2	4	Recognize the components of a regulator and understand its operation.	Components of a Regulator	Lecture and discussion	Homework assignment
Week 3	4	Design scour sluices according to engineering principles.	Design of Scour Sluices	Lecture and exercises	Classroom activity
Week 4	4	Distinguish between different types of regulators and their design requirements.	Design of Other Regulators	Lecture and design exercises	Homework assignment
Week 5	4	Understand the characteristics and functions of the main side canal.	Main Side Canal	Lecture and discussion	Short quiz
Week 6	4	Classify transition structures and identify their applications.	Transitions and Their Types	Lecture and exercises	Classroom assessment
Week 7	4	Evaluate students' understanding of the first-half course topics.	Midterm Examination	Written examination	Examination
Week 8	4	Apply engineering principles in the design of transition structures.	Design of Hydraulic Transitions	Lecture and design exercises	Design assignment
Week 9	4	Identify different types of water-crossing structures and their functions.	Water Crossing Structures	Lecture and case studies	Short quiz
Week 10	4	Design siphons according to standard hydraulic design criteria.	Siphon Design	Lecture and exercises	Homework assignment
Week 11	4	Recognize the types and functions of culverts.	Introduction to Culverts	Theoretical lecture	Classroom questions
Week 12	4	Design hydraulic culverts according to engineering standards.	Culvert Design	Lecture and design exercises	Design assignment
Week 13	4	Apply culvert design procedures through practical examples.	Culvert Design Example	Practical problem-solving	Practical assessment

Week 14	4	Understand the components and operation of a Charda Drop Structure.	Introduction to Charda Drop Structure	Lecture and illustrative presentation	Short quiz
Week 15	4	Apply design procedures for a Charda Drop Structure through a practical example.	Design Example of a Charda Drop Structure	Lecture and design exercises	Design assignment
Week 16	4	Review all course topics and prepare for the final examination.	Preparatory Week Before the Final Examination	Review and discussion	Preparatory assessment

7. Rivers Engineering (DWRE-407)

Module Information | معلومات المادة الدراسية		
Module Title	Rivers Engineering	
Arabic Module Title	هندسة الانهار	
Module Code	DWRE-407	
Module Type	C	
ECTS Credits	5	
SWL (hr/sem)	125	
Module Level	4	
Semester	Eight	
Course Instructor Name (if more than one, mention all):	Akram Khalaf Mohammed Jasim	
Language	English	
Prerequisite module	None	
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 module aims to introduce students to the fundamental principles governing water flow in natural rivers, including flow resistance, velocity distribution, sediment interaction concepts, channel morphology, bank stability, and river response to hydraulic and environmental conditions.	
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	Understand basic hydraulic behavior of natural river flows. Describe flow velocity distribution in open natural channels. Explain flow resistance and factors influencing roughness. Identify river cross-sectional geometry and its hydraulic implications. Interpret longitudinal river profiles and energy slopes. Distinguish between basic river plan form types and their behaviors. Recognize mechanisms of riverbank instability. Understand the conceptual basics of sediment motion initiation. Evaluate how floods alter channel shape and behavior.	
Indicative Contents **المحتويات الإرشادية**	Introduction to fluvial systems Basic open-channel hydraulics review Natural channel geometry: width, depth, hydraulic radius Velocity distribution in river cross-sections Flow resistance and roughness concepts (Manning qualitatively) Shear stress concept (qualitative) Sediment grain properties (size, shape, density) Initiation of motion (Shields concept – conceptual) River plan forms: straight, meandering, braided (why they form) Bank erosion fundamentals Longitudinal profiles & energy gradients Flood flow behavior in rivers River response to discharge & sediment variation	

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	Explanatory board lectures with diagrams Concept-focused tutorials (without heavy math) Visual imagery (aerial photos, river patterns) Short case-study discussions Video observation of flume behavior Guided conceptual problem solving Field morphology interpretation (photos/maps)

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or Topic Name**	**Learning Method**	**Assessment Method**
Week 1	4	Identify river systems, their characteristics, and engineering significance.	Introduction to River Systems	Theoretical lecture	Classroom questions
Week 2	4	Review the fundamental principles of open-channel hydraulics and their application in river engineering.	Review of Open-Channel Hydraulics	Lecture and discussion	Homework assignment
Week 3	4	Understand the characteristics of natural river channels and factors affecting their behavior.	Natural Channel Engineering	Lecture and exercises	Classroom activity
Week 4	4	Analyze velocity distribution in different river cross-sections.	Velocity Distribution in River Sections	Lecture and practical exercises	Short quiz
Week 5	4	Evaluate the effects of flow resistance and roughness on river hydraulics.	Flow Resistance and Roughness	Lecture and exercises	Homework assignment
Week 6	4	Calculate shear stress and assess its role in sediment transport.	Shear Stress and Sediment Movement	Lecture and practical exercises	Classroom assessment
Week 7	4	Assess students' understanding of the fundamental concepts covered in the first half of the course.	Midterm Examination	Written examination	Examination
Week 8	4	Analyze the physical and hydraulic properties of sediment particles.	Properties of Sediment Particles	Lecture and illustrative presentation	Short quiz
Week 9	4	Distinguish between straight, meandering, and braided rivers and evaluate their characteristics.	River Forms: Straight, Meandering, and Braided	Lecture and discussion	Homework assignment
Week 10	4	Understand the mechanisms of bank erosion and the factors influencing it.	Fundamentals of Bank Erosion	Lecture and exercises	Classroom activity
Week 11	4	Analyze longitudinal river profiles and energy gradients.	Longitudinal Profiles and Energy Slope	Lecture and practical exercises	Homework assignment
Week 12	4	Evaluate extreme-flow behavior and its impact on river morphology.	Extreme Flow Behavior	Lecture and discussion	Short quiz
Week 13	4	Assess river responses to changes in discharge and sediment load.	River Response to Changes in Discharge and Sediment Load	Lecture and analytical exercises	Classroom assessment
Week	4	Apply river engineering	Applications and Case Studies	Case study and	Report and

14		concepts to real-world projects and case studies.		discussion	assignment
Week 15	4	Review and integrate all course topics in preparation for the final examination.	General Review	Review and discussion	Exam preparation
Week 16	4	Demonstrate mastery of river engineering principles and analytical techniques.	Final Examination	Final examination	Final examination

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	Available in the Library?
Required Texts	Julien, P.Y. River Mechanics. Cambridge University Press.	No
Recommended Texts	Chang, H.H.Fluvial Processes in River Engineering. Wiley.	No

8. Dams and Reservoirs Engineering (DWRE-408)

Module Information | معلومات المادة الدراسية		
Module Title	Dams and Reservoirs Engineering	
Arabic Module Title	هندسة السدود والخزانات	
Module Code	DWRE-408	
Module Type	C	
ECTS Credits	5	
SWL (hr/sem)	125	
Module Level	4	
Semester	Eight	
Course Instructor Name (if more than one, mention all):	Asmaa Abdul-Jabbar Jameel Mahdi	
Language	English	
Prerequisite module	None	
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 ability to specify the storage zones of a reservoir. (i) An ability to estimate the reservoir storage capacity. (i) An ability to estimate the probable life of the reservoir. (i) An ability to specify the type of dam according to the conditions of valley. (i) Formulate a preliminary design of an earth dam base on the chosen type. (ii) An ability to specify the valley problems that considered during constructing an earth dam and ability to find solutions for these problems. (i), (ii) An ability to identify the solutions for the problems that may be appear in an earth dam during operation of reservoir. (iii)
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. Specify the storage zones of a reservoir. 2. Draw the storage-surface area-elevation curve for a reservoir. 3. Estimate the reservoir storage capacity. 4. Estimate the live storage. 5. Estimate the dead storage. 6. Estimate the Flood storage. 7. Estimate the probable life of the reservoir. 8. Rout the outflow hydrograph if the inflow hydrograph was known using level pool routing. 9. Estimate the economical height of a dam. 10. Estimate the types of earth dams. 11. Learn the modes of failure in earth dams. 12. Design of the Earth Dams. 13. Control the seepage through the body of the earth dam and its foundation. 14. Estimate the stability of slopes in an earth dam.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. Introduction to Dams Engineering, Storage Works, Hydrological Aspects, Geological Investigations, Reservoir Site Selection, Storage Zones of a Reservoir, Storage-Surface Area-Elevation, Volume of Storage Calculation Method. [4 hrs] Reservoir Storage Capacity Estimation, Live Storage Mass Curve Method, Tabulation Method, Hydrograph method, Sequent Peaks Analysis, Optimization Analysis. [8 hrs] Reservoir Sedimentation, Factors Effecting Sedimentation of Reservoir, Suspended Load Calculation {Discharge- Sediment Load Relationship, The probable life of the

	reservoir. [4 hrs] Flood Routing, Level Pool Routing. [8 hrs] Reservoir Flood Storage Capacity Estimation, Economical Height of a Dam, Classification of dams, Factors governing the selection of a particular type of dam. [8 hrs] Earth and Rock fill Dams (Rolled fill dam), Earth and Rock fill Dams (Foundation for earth dams, Suit available materials), Earth and Rock fill Dams (Modes of failure in earth dams). [8 hrs] Earth and Rock fill Dams (Seepage through the body of the dam), Earth and Rock fill Dams (Design Consideration of an Earth Dams). [4 hrs] Earth and Rock Fill Dams (SEEPAGE CONTROL A-Seepage Control through the body of the Dam), Earth and Rock fill Dams (SEEPAGE CONTROL B- Seepage Control Through the Foundation). [8 hrs] Earth and Rock fill Dams (Location of a phreatic line), Earth and Rock fill Dams (Stability of Slopes), Earth and Rock fill Dams (Pore Water Pressure). [8 hrs]

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) **الحمل الدراسي للطالب**			
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	4.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Topic Name	Learning Method	Assessment Method
Week 1	4	Understand the concepts of dam engineering, reservoir storage, and hydrological considerations in water resources projects.	Introduction to Dam Engineering, Storage Works, and Hydrological Aspects	Theoretical lecture	Classroom questions
Week 2	4	Calculate reservoir storage capacity and analyze mass curves for reservoir design.	Reservoir Storage Capacity Estimation and Mass Curve Analysis	Lecture and practical exercises	Homework assignment
Week 3	4	Apply the inflow-outflow method and sequential peak analysis in reservoir studies.	Inflow-Outflow Method and Sequential Peak Analysis	Lecture and exercises	Classroom activity
Week 4	4	Evaluate reservoir sedimentation processes and their effects on reservoir lifespan.	Reservoir Sedimentation and Expected Reservoir Life	Lecture and analytical exercises	Short quiz
Week 5	4	Analyze flood routing and storage requirements for flood management.	Flood Routing	Lecture and discussion	Homework assignment
Week 6	4	Assess students' understanding of the first-half course topics.	Midterm Examination	Written examination	Examination
Week 7	4	Understand flood storage concepts and their impact on reservoir operation.	Flood Storage in Reservoirs	Lecture and exercises	Short quiz
Week	4	Select appropriate	Selection of Dam and Reservoir	Lecture and case	Classroom

8		dam and reservoir sites based on engineering, geological, and hydrological criteria.	Sites	study	assessment
Week 9	4	Evaluate geological investigations and their importance in dam design.	Geological Investigations	Lecture and illustrative presentation	Homework assignment
Week 10	4	Distinguish between different types of dams and their applications.	Types of Dams	Lecture and discussion	Short quiz
Week 11	4	Compare earthfill and rockfill dams and understand their design requirements.	Earthfill and Rockfill Dams	Lecture and design exercises	Design assignment
Week 12	4	Apply stability analysis principles to evaluate dam safety and performance.	Fundamentals of Stability Analysis	Lecture and analytical exercises	Classroom assessment
Week 13	4	Understand the functions and design requirements of spillways and flood-control structures.	Spillways and Flood-Control Structures	Lecture and illustrative presentation	Homework assignment
Week 14	4	Apply dam design principles to practical engineering examples and case studies.	Design Applications	Case study and practical exercises	Report and assignment
Week 15	4	Review and integrate all course topics in preparation for the final examination.	General Review	Discussion and review session	Preparatory assessment
Week 16	4	Demonstrate comprehensive understanding of dam engineering and reservoir design concepts.	Final Examination	Final examination	Final examination

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	Available in the Library?
Required Texts	1. Hydraulics of Dams and Reservoirs, By: Fuat Senturk, Water Resources Publications, Colorado, U.S.A.,1994. 2. Theory and Design of Irrigation Structures, Vol. II, By: R. S. Varshney, S. C. Gupta and R. L. Gupta, Nem Chand & Bros, Roorkee (U.P.), India,1982. 3. Earth-Rock Dams, Engineering Problems of Design and Construction, By: J. L. Sherard, R. J. Woodward, S. F. Gizienske and W. A. Clevenger, John Wiley and Sons, Inc., New York, 1963. 4. Engineering for Dams, By: W. P. Greager, J. D. Justin and J. Hinds, In three Volumes, John Wiley and Sons, Inc., New York, 1961.	No
Recommended Texts	Loucks, D. P., Van Beek, E., Stedinger, J. R., Dijkman, J. P., and Villars, M. T. (2005). Water Resources Systems Planning and Management: An Introduction to Methods, Models and Applications. Paris, UNESCO.	No
Websites	https://www.youtube.com/channel/UCq1v13fN72524RRtY0mMC9A	

9. Sanitary Engineering (DWRE-409)

Module Information | معلومات المادة الدراسية	
Module Title	Sanitary Engineering
Arabic Module Title	الهندسة الصحية
Module Code	DWRE-409
Module Type	C
ECTS Credits	4
SWL (hr/sem)	100
Module Level	4
Semester	Eight
Course Instructor Name (if more than one, mention all):	Samaher Jasim Mohammed
Language	English
Prerequisite module	None

Relation With Other Modules **العلاقة مع المواد الدراسية الأخرى**		
Prerequisite module	None	Semester
Co-requisites module	None	Semester
Module Aims, Learning Outcomes, Indicative Contents and Brief Description **أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر**		
Module Aims **أهداف المادة الدراسية**	1. The course aims to introduce students to the basics of designing and evaluating wastewater networks and their accessories, such as the types of pipes used. 2. Introduce students to the sources of sewage water, runoff in sewage pipes, and what are the accessories of sewage networks 3. Teaching students the basics of designing storm networks and their accessories. 4. Teaching the student to calculate the amounts of rain water.	
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	1. The learner will be able to design a sewage networks system in addition to knowing the accessories of the network and everything related to the works of its two sites. 2. Knowing the details of the storm networks system and rainfall calculations, in addition to the network accessories and everything related to its site engineering works. 3. Design of lift stations as well as design of waterways for buildings	
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. Undergraduate Review (4 hrs) Fundamentals of sewage network design (20 hrs) Case studies and evaluate sewage network (15 hrs) Fundamentals of storm network design (20 hrs) Case studies and evaluate storm network (11 hrs)	
Course Description	This course aims to form the basic knowledge for designing and evaluating infrastructure networks (sewage network system and storm network system). The presentation of the course begins with studying the methods of collecting water for the two networks, calculating their quantities, and then using the results in designing the network, in addition to studying the international standards for these networks. Networks evaluation (sewage network system and storm network system) and ways to fix it were also discussed	
Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**		
Strategies	The learning and teaching strategy is designed to: Carefully cover in lectures the necessary fundamental material and analytical techniques, and demonstrate concepts with appropriate (and where possible practical) examples Allow students adequate time to practice the techniques using a large number of carefully selected tutorial problems.	

Student Workload (SWL) **الحمل الدراسي للطالب**			
Structured SWL (h/sem) الحمل الدراسى المنتظم للطالب خلال الفصل In class lectures 50 In class tests 10 Seminars 3	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل Library, dorm, home memorizing 17 Preparation for tests 10 Home works 10	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

10. Course Structure					
Week	**Hours**	**Required Learning Outcomes**	**Unit or Topic Name**	**Learning Method**	**Assessment Method**
Week 1	4	Understand the concept of sanitary engineering and its role in protecting public health and the environment.	Introduction	Theoretical lecture	Classroom questions
Week 2	4	Distinguish between different types of wastewater and identify their physical and chemical characteristics.	Types and Characteristics of Wastewater	Lecture and discussion	Homework assignment
Week 3	4	Identify the types of sewer pipes and their engineering applications.	Sewer Pipes	Lecture and illustrative presentation	Short quiz
Week 4	4	Estimate wastewater quantities generated from residential and urban areas.	Estimation of Wastewater Quantity	Lecture and practical exercises	Homework assignment
Week 5	4	Calculate wastewater discharge based on population and water consumption rates.	Estimation of Wastewater Quantity Using Population Data	Lecture and exercises	Classroom assessment
Week 6	4	Design sanitary sewer systems according to engineering standards.	Design of Sanitary Sewer Systems	Lecture and design exercises	Design assignment
Week 7	4	Assess students' understanding of the first-half course topics.	Midterm Examination	Written examination	Examination
Week 8	4	Apply engineering principles in the design of stormwater drainage systems.	Design of Stormwater Sewers	Lecture and design exercises	Design assignment
Week 9	4	Analyze rainfall runoff movement within stormwater drainage networks.	Stormwater Investigations	Lecture and discussion	Short quiz
Week 10	4	Conduct surface and subsurface surveys required for sewer network design.	Surface and Subsurface Surveying	Lecture and field applications	Practical report
Week 11	4	Prepare preliminary layouts for sanitary and stormwater drainage systems.	System Planning	Lecture and practical exercises	Homework assignment
Week 12	4	Apply rainfall equations and rainfall intensity relationships in hydrological design.	Rainfall Equation and Stormwater Quantity	Lecture and computational exercises	Short quiz
Week	4	Design inlets and	Design of Inlets and Pipelines	Lecture and	Design

13		pipelines for stormwater and wastewater collection systems.		design exercises	assignment
Week 14	4	Design pipelines and manholes according to operational and hydraulic requirements.	Design of Pipelines and Manholes	Lecture and practical exercises	Classroom assessment
Week 15	4	Review longitudinal profiles and evaluate the performance of drainage networks.	Longitudinal Profile	Lecture and comprehensive review	Preparatory assessment
Week 16	4	Demonstrate comprehensive understanding of sanitary engineering principles and sewer design procedures.	Final Examination	Final Examination	Final Examination

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	Available in the Library?
Required Texts	Water Supply and Sewage, by E.W. Steel, and T.G. McGhee. 1979 A Guide to selection of cost-effective wastewater treatment system by Mc kinney R. E.; United Stats Environmental j.; 1975	Yes
Recommended Texts	Haestad Methods S. Rocky Durrans. STORMWATER CONVEYANCE MODELING AND DESIGN. Bentley Institute Press, 2007	No

10. Graduation Project II (DWRE-410)

Module Information | معلومات المادة الدراسية	
Module Title	Graduation Project II
Arabic Module Title	مشروع تخرج II
Module Code	DWRE-410
Module Type	C
ECTS Credits	6
SWL (hr/sem)	150
Module Level	4
Semester	Eight
Language	English
Prerequisite module	None

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 purpose of the Graduation Project is to assure/ascertain that the students have acquired the skills, knowledge, and concepts necessary to perform well when they leave the university. Each student will use educational tools to broaden his/her knowledge about a particular, self-selected topic. Students are also expected to show how proficient they are in solving real-world problems with certain constraints for the outcome-based evaluation by the review board.
Module Learning Outcomes **مخرجات التعلم للمادة الدراسية**	On successful completion of this course, students will be able to: LO1. Understand and apply the fundamentals of engineering-design practices and procedures LO 2. Participate in teamwork activities. LO 3. Implement the techniques of oral and written presentations. LO 4. Identify an engineering problem and assess alternative solutions. LO 5. Apply project management fundamentals. LO 6. Understand the ethics of the engineering profession and water resources engineering issues. LO 7. Interact with industry and related non-governmental organizations.
Indicative Contents **المحتويات الإرشادية**	The graduation project will be a meaningful experience that provides a student with the opportunity for in-depth learning about a selected topic. The purpose of the project is to assure that the student is able to apply, analyze, synthesize, and

	evaluate information and communicate significant knowledge and understanding through a presentation. The project will be under the guidance and direction of the dept. faculty/administrators and will be assessed by an evaluation team.

Learning and Teaching Strategies **استراتيجيات التعلم والتعليم**	
Strategies	Technical Report - Literature Review and Analysis - Project Problem Formulation and Solutions (Goals) - Report Organization - According to the template of the department Methodology and Procedures - Design - Implementation - Testing Individual Student Evaluation - Individual Contribution - Oral Presentation - Team Work Individual Student Evaluation by the Supervisor - Individual Contribution - Student Commitment - Team Work.

Student Workload (SWL) **الحمل الدراسي للطالب محسوب لـ 15 اسبوعا**			
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	102	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Learning and Teaching Resources **مصادر التعلم والتدريس**		
	Text	Available in the Library?
Required Texts	Graduation project writing instructions template تعليمات كتابة مشروع التخرج	No
Recommended Texts		No