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

Academic Program and Course Description Guide

2024

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 staff 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, quarterly), 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: University of Anbar

Faculty/Institute: Faculty of Engineering

Scientific Department: Dams and Water Resources Engineering

Academic or Professional Program Name: Dams and Water Resources Engineering

Final Certificate Name: Dams and Water Resources Engineering

Academic System: Courses

Description Preparation Date: 24/9/2024

File Completion Date: 24/9/2024

Signature:

Head of Department Name: Yasir Abdulmajeed Mohammed

Date:

M. A. Ahmed

Signature:

Scientific Associate Name: Mohammed Abed Ahmed

Date:

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Date:

Signature:

UNIVERSITY OF ANBAR COLLEGE OF ENGINEERING Dean

Approval of the Dean

1. Program Vision

To be a national leader in education and research in the field of dams and water resources engineering recognized for world-class graduates.

2. Program Mission

To provide quality education by integrating the principles of science and engineering with technical, innovative, and communication skill, and to conduct applied research that investigate pioneer solutions to the challenges of dams and water resources engineering

3. Program Objectives

The Dams and Water Resources Engineering program is providing graduates with solid practical and professional knowledge to excel in this field of engineering. Within a few years after graduating, our students will:

1- Be successful professionals in Dams Engineering and related fields.

2- Be adhered to the professional ethics and the accepted standards.

3- Purse leadership roles and demonstrate effective communication and collaboration in their workplace and the society.

4- Peruse lifelong learning through continued development of their technical and professional skills.

4. Program Accreditation

No accreditation- Under preparation

5. Other external influences

None

6. Program Structure

Program Structure	Number of	Credit hours	Percentage	Reviews*

	Courses			
Institution Requirements	5	11	5	
College Requirements	12	64	27	
Department Requirements	28	165	68	
Summer Training	----	-----		
Other				

* This can include notes whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
1st/1			**theoretical**	**practical**
	ENG 001	Physics	3	2
	ENG 002	Chemistry	3	2
	ENG 003	Calculus I	3	
	ENG 005	Fundamentals of Electrical Engineering	2	2
	DWR 001	Building Construction	2	
	UOA 005	Human Rights and Democracy	2	
1st/2	ENG 004	Calculus II	3	
	ENG 006	Engineering Mechanics	3	
	ENG 007	Engineering Drawing	2	3
	UOA 003	English Language I	2	
	UOA 007	Computer Science I	2	2
	DWR 002	Engineering Geology	3	2
	UOA 001	Arabic Language I	2	
2nd/1	ENG 008	Calculus III	3	
	DWR 003	Fluids Mechanics	3	2
	DWR 004	Engineering surveying I	2	2
	DWR 005	Concrete Technology	2	2
	ENG 010	Engineering Statistics	3	
	UOA 006	The crimes of Baath regime in Iraq	2	
2nd/2	ENG 009	Calculus IV	3	
	DWR 006	Open Channels	2	

	DWR 007	Dynamics	2	
	DWR 008	Engineering surveying 2	2	2
	DWR 009	Strength of Materials	2	2
3rd/1	DWR 010	Engineering Hydrology	2	
	DWR 011	Water Quality	2	2
	DWR 012	Soil Mechanics	3	2
	DWR 013	Theory of Structures	3	
	DWR 014	Engineering Management	2	
3rd/2	DWR 015	Ground Water Hydrology	2	
	DWR 016	Water Resources Planning and Management	3	
	DWR 017	Hydraulic Structures	2	2
	ENG 011	Engineering Numerical Methods	3	2
	DWR 018	Sanitary Engineering	2	
4th/1	DWR 019	Irrigation and Drainage Engineering	3	
	DWR 020	Design of Dams	3	
	ENG 012	Ethics and Leader Skills	2	
	DWR 021	Environmental Engineering	2	
	DWR 022	Senior Design Project I	2	1
	DWE 4332	Design and Evaluation of on – Farm Irrigation Systems	3	
	DWE4307	Engineering Optimization	4	
	DWE 4312	Remote Sensing	5	
4th /2	DWR 024	Methods of Construction and Estimation	3	
	DWR 025	Safety and Operation of Dams	3	
	DWR 026	Foundations Engineering	3	
	DWR 027	Senior Design Project II	3	1
	DWR 023	Reinforced Concrete Design	3	

8. Expected learning outcomes of the program

Knowledge	
Learning Outcomes A1	Fundamental Engineering Knowledge
Learning Outcomes A2	Core Dams and Water Resources Engineering Knowledge

Learning Outcomes A3	Design of Engineering Projects
Skills	
Learning Outcomes B1	Problem-Solving and Analytical Skills
Learning Outcomes B2	Technical and Laboratory Skills
Learning Outcomes B 3	Teamwork and Communication Skills
Learning Outcomes B4	Safety and Risk Management Skills
Ethics	
Learning Outcomes C1	Project Management and Leadership Skills
Learning Outcomes C2	Moral Responsibility in Engineering
Learning Outcomes C3	Environmental Stewardship

9. Teaching and Learning Strategies

1. Lectures and Tutorials
2. Laboratory Sessions
3. Project-Based Learning (PBL)
4. Field Trips and Industrial Visits

10. Evaluation methods

1. **Written Examinations**

Midterm and Final Exams: Traditional exams are used to assess students' understanding of core theoretical concepts, such as thermodynamics, fluid mechanics, material balances, and reaction kinetics.

2. **Quizzes and Short Tests**

Frequent Assessment: Quizzes, both in-class and online, are used for continuous assessment of students' understanding throughout the course. They may cover recently taught material or foundational concepts.

3. **Laboratory Reports and Practical Assessments**

Lab Performance: Students are evaluated on their ability to conduct experiments safely and accurately, following proper protocols, using instrumentation, and collecting data.

11. Faculty

Faculty Members

Khamis Naba Sayl | Ph.D. in Construction Management | Professor

Email: knsayl@uoanbar.edu.iq

Mobile: 00964 7901887304

Ammar Hatem Kamel Al-Ani | Ph.D. in Civil Engineering-water resources | Professor

Email: ammar.kamel@uoanbar.edu.iq

Mobile: 07835057104

Ammar Adham Ali | Ph.D. in Water Resources Engineering | Assistant Professor

Email: engammar2000@unoanbar.edu.iq

Mobile: 009647903206401

Sadeq Oleiwi Sulaiman | Ph.D. in Water Resources Engineering | Professor

Email: sadiqsoliman@uoanbar.edu.iq

Mobile: +964-783-104-5828

Juma'a. Awad Hemed Jasim AL-Sumaidaii | Ph.D. in Construction Management | Assistant Professor

Email: jah_eng@uoanbar.edu.iq

Mobile: 07906227504

Nabeel S. Mahmood | Ph.D. in Civil Engineering- Geotechnical | Assistant Professor

E-mail: nabeelshm@uoanbar.edu.iq

Mobile : (+964) 781-777-9698

Rafid S. Rahid Alboresha | Ph.D. in Water Resources Engineering | Assistant Professor
Email:rafid.alboresha@unoanbar.edu.iq
Mobile: 009647824411599

Arkan Dhari Jalal | Ph.D. in Environmental Engineering | Assistant Professor
E-mail: arkan.dhari@uoanbar.edu.iq
Mobile: 009647827549961

Zaid kani Al-Azzawi | Ph.D. in Structural Engineering | Assistant Professor
E-mail : zaid.kani@uoanbar.edu.iq
Mobile : 07736702467

Ghassan Subhi Jameel Ph.D. in Concrete Design and Technology| Lecturer
E-mail: gsj_alkubaisi@yahoo.com
Mobile:009647829019571

Abdulrahman Suhail Mohammed |M.Sc. in Civil Engineering/ Water Resources| Lecturer
E-mail: Abdulrahman.suhail@uoanbar.edu.com
Mobile: 07906809224

Majeed Mattar Ramal |M.Sc. Environmental Engineering | Professor
E-mail: majeed.mattar@uoanbar.edu.iq
Mobile: +964 771 613 1725

Muhannad H. Ismail Aldosary |Ph. D. in Structural Engineering| Lecturer
E-mail: : muhannad_dosary@uoanbar.edu.iq
Mobile: 00964 - 07802855350

_____Ayad Saeed Aadi |Ph. D. in Civil Engineering| Assistant Professor
E-mail: ayad_saeed@uoanbar.edu.iq
Mobile: 07802418309

_____
Safaa Ahmed Ibrahim |M.Sc. Civil Engineering/ Water Resources Assist |Lecturer
E-mail: asafaa42@yahoo.com
Mobile: 07811034698

_____Ahmed Amin Jubair |M. Sc in Geotechnical Engineering |Assistant Lecturer
E-mail: jubair1a@uoanbar.edu.iq
Mobile: 07806757694

_____
Aseel Madallah Mohammed| Ph. D. Concrete Technology and Design| Lecturer
E-mail: aseel.mohammed@unoanbar.edu.iq
Mobile: 009647806014743

_____
Haitham Zeddan Hussein| Ph. D. in Constructions Materials| Lecturer
E-mail: haithamz1978@uoanbar.edu.iq
Mobile: +964-07848723444

_____
Mohammed T. Nawar| Master in Structural Engineering| Lecturer
E-mail: mohammad.nawar@uoanbar.edu.iq
Mobile: 07815470993

_____Uday Hateem Abdulhameed |Master in Water resources engineering | Lecturer
E-mail: uday_hatem@uoanbar.edu.iq
Mobile: 00964 - 07809410321

_____

Yaser A. Mohammad | Ph.D in Environmental engineering | Assistant Professor
E-mail: aniyaser@uoanbar.edu.iq
Mobile: 07830821878

Atheer Saleem Obaid Almawla|Ph.D in Water Resources Engineering | Lecturer
E-mail: eng.atheer84@uoanbar.edu.iq
Mobile: 00964 - 7906880444

Ghassan Abbas Hammadi|master's in civil engineering | Assistant Lecturer
E-mail: gha17e105@uoanbar.edu.iq
Mobile: 00964 - 7828238593

Aseel Hossam Aldin Abdulla Abdaljader|Master in Construction Management- Civil Engineering | Assistant Lecturer
E-mail: aseel.abdulla67@uoanbar.edu.iq
Mobile: 00964 - 7712036991

Shireen Ibrahim Mohammed|Master in Surveying Engineering | Assistant Lecturer
E-mail: Shireenmohammed@uoanbar.edu.iq
Mobile: 00964 – 7810418744

Ibtihal Ahmed Mawlood|Ph.D in Environmental Engineering | Lecturer
E-mail: ibtihal.maoloud@uoanbar.edu.iq
Mobile: 00964 – 7902667369
Ammar Ahmed Hammadi | M.Sc. Concrete Design and Technology | Assistant Lecturer
Email: ammar.ahmed@unoanbar.edu.iq
Mobile: 009647820034297

Hend Saad Zayan|Master in Concrete design & Technology- Civil Engineering | Lecturer
E-mail: hind.saad@uoanbar.edu.iq
Mobile: 00964 – 7906129362

Ayad Khalid Mohammed|Master in Dams and Water Resources Engineering| Assistant Lecturer
E-mail: ayad-alhity@uoanbar.edu.iq
Mobile: 00964 – 7831925380

Mohammed Falah Allawi|Ph.D in Water Resources Engineering-Civil Engineering|Lecturer
E-mail: mohammed.falah@uoanbar.edu.iq
Mobile: 00964 – 7725056250

Majid Hadi Talal Muhamad|Ph.D in Islamic Sciences- Jurisprudence and Its Origins|Lecturer
E-mail: mqaessy@uoanbar.edu.iq
Mobile: 00964 – 7519249814

Ahmed Ashour Enad Master in Water Resources- Civil Engineering |Assistance Lecturer
E-mail: ahmedalfaoury76@uoanbar.edu.iq
Mobile: 00964 –7810086192

Mohammed Hatem Abdullah|Master in Structural Engineering- Civil Engineering |Assistance Lecturer
E-mail: mohammed.alani@uoanbar.edu.iq
Mobile: 00964 –7906144756

Professional Development

Mentoring new faculty members

Mentoring new faculty members is a crucial process in helping them transition smoothly into their roles, develop professionally, and succeed in their academic careers. Effective mentoring provides support in areas such as teaching, research, service, and navigating the institutional culture. Below are strategies and guidelines for mentoring new faculty:

1. Orientation and Institutional Support
2. Teaching Mentorship
3. Research Mentorship
4. Service and Professional Development

Professional development of faculty members

1. Teaching Enhancement:

- Workshops and seminars on innovative teaching methods, curriculum design, and classroom technology.
- Peer observation and feedback to refine teaching practices and enhance student engagement.
- Training on inclusive teaching and addressing diverse learning needs.

2. Research Development:

- Support for securing research grants, writing proposals, and publishing in high-impact journals.
- Collaborative opportunities within the institution or with external partners to advance research agendas.
- Access to resources such as research tools, labs, and mentoring for improving research productivity.

3. Leadership and Service Skills:

- Training for leadership roles, such as department chairs or committee leads, to help faculty contribute to institutional governance.
- Professional development in managing service responsibilities and navigating institutional politics.

4. Workshops and Conferences:

- Encouragement to attend academic conferences and workshops for networking and staying updated on field advancements.

- Presenting research at conferences to build professional credibility and broaden academic influence.

5. Technology and Pedagogy:

- Training in new educational technologies, online teaching platforms, and tools for engaging students digitally.
- Continuous learning about evolving pedagogical trends to enhance teaching effectiveness.

6. Mentorship and Peer Support:

- Formal or informal mentorship programs where senior faculty guide newer faculty in career progression and work-life balance.
- Peer support groups for sharing best practices, research collaboration, and teaching innovations.

Faculty professional development ensures continuous improvement, helping educators excel in their roles while adapting to the dynamic demands of higher education.

12. Acceptance Criterion

Central Admission

13. The most important sources of information about the program

The most important sources of information about an academic program are essential for students, faculty, and stakeholders to understand the program's structure, objectives, and requirements. Below are the key sources of information:

1. Program Handbook or Catalog

- Comprehensive Guide: The official program handbook or academic catalog contains detailed information about the curriculum, course descriptions, program objectives, and graduation requirements. It is usually available through the university's website or in print form.
- Policies and Procedures: It includes academic policies, grading systems, academic integrity guidelines, and program-specific requirements like internships or research projects.

2. Departmental Website

- Central Hub: The department's website serves as the primary source for up-to-date information on the program. It typically provides details about faculty members, courses offered, research areas, facilities (such as labs), and application processes.
- News and Updates: It often features announcements about new courses, events, seminars, and changes in program structure or requirements.

3. Course Syllabus

- Course-Level Information: Each course syllabus provides specific information about course content, learning outcomes, assessment methods, and required materials. It serves as a guide for students to understand what is expected of them in each class.

14. Program Development Plan

A Program Development Plan for a Dams and Water Resources Engineering program outlines the strategy for continuous improvement, addressing academic, research, industry, and societal needs. The plan typically aligns with institutional goals, accreditation standards, and evolving industry requirements. Below are key elements of a Program Development Plan:

1. Curriculum Enhancement

- Regular Curriculum Review: we did a review to ensure that the curriculum remains current by integrating the latest advancements in chemical and petrochemical engineering technologies. This involves periodic reviews and updates to course content, textbooks, and learning resources.
- Interdisciplinary Integration: we put a plan to encourage the inclusion of interdisciplinary courses that blend chemical engineering with fields like materials science, environmental engineering, and data analytics.

2. Faculty Development

- Professional Development: we plan for faculty professional development through workshops, conferences, and sabbaticals to help them stay updated with the latest trends in engineering education and research.
- Mentorship Programs: Establish formal mentorship programs for new faculty to support their teaching and research activities, ensuring a smooth transition and career progression.

3. Research and Innovation

- Research Focus Areas: we put a plan to promote research in areas critical to the chemical and petrochemical industries, such as process optimization, catalysis, energy storage, and carbon capture technologies.
- Industry Collaboration: we put a plan to enhance collaboration with industry for joint research projects, funding opportunities, and technology transfer initiatives. This could involve setting up research centers or establishing industry advisory boards.

4. Infrastructure and Laboratory Upgrades

- State-of-the-Art Laboratories: we will upgrade laboratories with modern equipment and technologies that reflect current industry practices, such as process control systems, simulation software, and high-tech analytical instruments.
- Virtual and Remote Labs: we will develop virtual lab platforms and simulations to enhance learning, especially in areas where physical lab work might be limited or expensive.
- Sustainable Practices: we put a guide to ensure that labs and facilities adopt sustainable and environmentally friendly practices, such as waste reduction and energy-efficient technologies.

5. Accreditation and Quality Assurance

By implementing these strategies, the Program will remain relevant, responsive to industry trends, and aligned with both academic excellence and societal needs.

Program Skills Outline															
				Required program Learning outcomes											
Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
1st/1	ENG 001	Physics	Basic	x	x			x							
	ENG 002	Chemistry	Basic	x	x			x							
	ENG 003	Calculus I	Basic		x				x						
	ENG 005	Fundamentals of Electrical Engineering	Basic		x										
	DWR 001	Building Construction	Basic		x										
	UOA 005	Human Rights and Democracy	Basic	x								x	x		
1st/2	ENG 004	Calculus II	Basic		x			x							
	ENG 006	Engineering Mechanics	Basic		x			x							
	ENG 007	Engineering Drawing	Basic		x										
	UOA 003	English Language I	Basic		x										

	UOA 007	Computer Science I	Basic	x	x				x						
	DWR 002	Engineering Geology	Basic	x	x				x						
	UOA 001	Arabic Language I	Basic	x	x				x	x			x		
2nd/1	ENG 008	Calculus III	Basic	x	x										
	DWR 003	Fluids Mechanics	Basic		x										
	DWR 004	Engineering surveying I	Basic		x										
	DWR 005	Concrete Technology	Basic	x	x										
	ENG 010	Engineering Statistics	Basic	x											
	UOA 006	The crimes of Baath regime in Iraq	Basic									x	x	x	x
2nd/2	ENG 009	Calculus IV	Basic		x										
	DWR 006	Open Channels	Basic		x										
	DWR 007	Dynamics	Basic		x										
	DWR 008	Engineering surveying 2	Basic	x	x										

	DWR 009	Strength of Materials	Basic	x	x										
3rd/1	DWR 010	Engineering Hydrology	Basic		x										
	DWR 011	Water Quality	Basic		x										
	DWR 012	Soil Mechanics	Basic	x											
	DWR 013	Theory of Structures	Basic	x											
	DWR 014	Engineering Management	Basic	x											
3rd/2	DWR 015	Ground Water Hydrology	Basic		x										
	DWR 016	Water Resources Planning and Management	Basic	x											
	DWR 017	Hydraulic Structures	Basic	x											
	ENG 011	Engineering Numerical Methods	Basic	x											
	DWR 018	Sanitary Engineering	Basic	x											
4th/1	DWR 019	Irrigation and Drainage	Basic	x											

		Engineering													
	DWR 020	Design of Dams	Basic	x											
	ENG 012	Ethics and Leader Skills	Basic	x								x	x	x	x
	DWR 021	Environmental Engineering	Basic	x											
	DWR 022	Senior Design Project I	Basic	x					x	x			x	x	
	DWR 023	Reinforced Concrete Design	Basic	x	x										
4th/2	DWR 024	Methods of Construction and Estimation	Basic	x											
	DWR 025	Safety and Operation of Dams	Basic	x											
	DWR 026	Foundations Engineering	Basic		x										
	DWR 027	Senior Design Project II	Basic	x	x				x	x			x	x	
	DWR 028	Pipe Networks	Basic	x											

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

Course Description Form

Course Name:
Physics
Course Code:
EN001
Semester / Year:
1st semester/2024-2025
Description Preparation
Date:26/12/2024
Available Attendance Forms
Official working hours
Number of Credit Hours (Total) / Number of Units (Total)
125/5
Course administrator's name (mention all, if more than one name)
Name: Dr.Haitham Zeddan Hussein Email: haithamz1978@uoanbar.edu.iq Name: Hend Saad Email:hind.saad@uoanbar.edu.iq
Course Objectives
Course Objectives • Understanding the basics of physics problems. • Study the motion of particles in one and two dimensions, vectors and newton's laws. • Study fluid mechanics. • Study temperature and thermal equilibrium. • Study work done and energy
Teaching and Learning Strategies
Strategy 1. Understand the basic Physics and measurement; Kinematics of motion of a single particle in one and two dimensions; Kinematics of projectile and circular motion. 2. Understand the Newton's Laws; Free body diagrams; various types of mechanical forces; Application on the use of Newton's Laws 3. Understand the Phases of matter; Pressure and density, Equations of Fluid static; Equations of fluid dynamics: Continuity and Bernoulli's equations 4. Understand the Work done and energy. Understand the concept of temperature and thermal equilibrium, Measuring temperatu Thermal expansion
Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Physics and Measurements	1-7	Theoretical	Discussion, quick exam, problem solving,

					homework
2	3	Motion in one Dimension	1-7	Theoretical	Discussion, quick exam, problem solving, homework
3	3	Vectors	1-7	Theoretical	Discussion, quick exam, problem solving, homework
4	3	Motion in two Dimensions1	1-7	Theoretical	Discussion, quick exam, problem solving, homework
5	3	Motion in two Dimensions2	1-7	Theoretical	Discussion, quick exam, problem solving, homework
6	3	State the Newton's three laws of motion and apply them to solve problems on one and two dimensional translational motion.	1-7	Theoretical	Discussion, quick exam, problem solving, homework
7	3	Circular Motion	1-7	Theoretical	Discussion, quick exam, problem solving, homework
8	3	Laws of motion	1-7	Theoretical	Discussion, quick exam, 9problem solving, homework
9	3	State the two conditions of static and dynamic equilibrium of a point particle and a rigid body, and use them to solve problems of static equilibrium.	1-7	Theoretical	Discussion, quick exam, problem solving, homework
10	3	Analyze the problems of static fluid in terms of density and pressure,	1-7	Theoretical	Discussion, quick exam, problem solving,

		and fluid at motion using the continuity equation and Bernoulli's equation.			homework
11	3	Describe Simple Harmonic Motion qualitatively and quantitatively	1-7	Theoretical	Discussion, quick exam, problem solving, homework
12	3	Define what is meant by: temperature, specific and molar heats of capacity.	1-7	Theoretical	Discussion, quick exam, problem solving, homework
13	3	State zeroth and first laws of thermodynamics and use them to solve some related problems.	1-7	Theoretical	Discussion, quick exam, problem solving, homework
14	3	Explain the theory of heat energy transfers and apply it in some simple situations.	1-7	Theoretical	Discussion, quick exam, problem solving, homework
15	3	Energy and Energy Transfer	1-7	Theoretical	Discussion, quick exam, problem solving, homework
Lab.					
1	2	Determination The Density of Solid Materials			
2	2	Verification of Hooks Law			
3	2	Determination the Value of Gravity Acceleration (Simple Pendulum)			
4	2	Determination the Coefficient of Viscosity			
5	2	Measurement of Liquid Density			
6	2	Verification of Newton's Second Law			

7	2	Verification of continuity Equation			
8	2	Determination the Mechanical Equivalent of Heat			
9	2	Determination the Specific Heat Capacity of a Solid			

Course Evaluation	
1- Monthly exams: 20% 2- Mid exams: 10% 3- Homework: 5% 4- Commitment to working hours + daily participation: 5% 5- Lab 10% 6- Final exam: 50%	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	---
Main references (sources)	R.D. Knight, Physics for Scientists and Engineer 2nd ed., Pearson 2008 Laboratory Manual, Com by Instructor
Recommended books and references (scientific journals, reports...)	---
Electronic References, Websites	----

Course Description Form

Course Name:	
Chemistry	
Course Code:	
DWE 1205	
Semester / Year:	
First semester / First Level	
Description Preparation Date:	
25/12/2024	
Available Attendance Forms:	
Official Attendance	
Number of Credit Hours (Total) / Number of Units (Total)	
90	
Course administrator's name (mention all, if more than one name)	
Name: Professor : Majeed Mattar Ramal Email: majeed.mattar@uoanbar.edu.iq	
Course Objectives	
Course Objectives	The goals of this course are to enable students to: 1-Provide a thorough understanding and principles of chemistry. 2-Provide a thorough understanding practical applications of chemical analysis, Chemical bonding and molecular geometry. 3-Provide a thorough understanding and practical applications of Stoichiometry
Teaching and Learning Strategies	

Strategy	1- Using modern means to present the scientific and theoretical side such as Data Show devices to attract attention and engage students so that the idea reaches the student in a better way. 2- Giving students extracurricular assignments that require them to exert skills and self-explanations in experimental ways. 3- Questioning students through discussion groups by asking intellectual questions such as: (how, why, when, where, which) for specific topics. 4- Using the brainstorming and mental nutrition method in order to activate the accumulated experiences of students by linking what was taken from study materials in the pre-university stages and linking them to the new ones. 5- Providing students with practical skills by linking their studies to practical reality

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	6	Measurements .Handling Numbers. Dimensional Analysis in Solving Problems Recognize chemical safety and hazardous materials icons, and apply laboratory safety rules.	Measurements	Theoretical and Practical	Homework
2	6	Atomic Number, Mass Number, and Isotopes. The Periodic Table. Molecules and Ions. Describe laboratory instruments and some basic techniques used in the chemistry laboratory, including balances and standard volumetric equipment.	Atomic , Molecules and Ions	Theoretical and Practical	Quiz, Discussion Homework, Solve Problems
3	6	Chemical Formulas. Naming Compounds. Atomic Mass. Avogadro's number and Molar Mass of an Element. Describe and use UV/VIS	Chemical Formulas	Theoretical and Practical	Quiz, Discussion Homework, Solve Problems

		spectrophotometric methods of analysis.			
4	6	Molecular Mass. The Mass Spectrometer. Percent Composition of Compounds. Experimental Determination of Empirical Formulas. Chemical Reactions and Chemical Equations. Describe how to Prepare accurate laboratory reports of their experimental results. Mass and Volume Measurements.	Molecular Mass	Theoretical and Practical	Quiz, Discussion Homework, Solve Problems
5	6	Amounts of Reactants and Products. Limiting Reagent Calculations. Reaction Yield. Qualitative Analysis of Anions : Part I	Reactions	Theoretical and Practical	Quiz, Discussion Homework, Solve Problems
6	6	General Properties of Aqueous Solutions. Precipitation Reactions. Acid-Base Reactions. Oxidation-Reduction Reactions. Qualitative Analysis of Anions : Part II	General Properties of Aqueous Solutions	Theoretical and Practical	Mid-term Exam, Discussion Homework, Solve Problems
7	6	Concentration of Solutions. Acid-Base Titrations. Gases. Pressure. The Empirical Formula of a Metal Oxide.	Concentration of Solutions	Theoretical and Practical	Quiz, Discussion Homework, Solve Problems
8	6	The Ideal Gas Equation. Gas Stoichiometry. Partial Pressures	The Ideal Gas Equation	Theoretical and Practical	Quiz, Discussion Homework, Solve Problems

9	6	Volumetric Analysis: Standardization of Sodium Hydroxide and Determination of Molar Mass of an Acid The Nature of Energy and Types of Energy. Energy Changes in Chemical Reactions. Introduction to Thermodynamics.	Energy	Theoretical and Practical	Quiz, Discussion Homework, Solve Problems
10	6	Applications of Volumetric Analysis: Determination of Active Ingredients of Commercial Bleach and Vinegar.. Enthalpy of Chemical Reactions. Calorimetry. Standard Enthalpy of Formation and Reaction.	Enthalpy	Theoretical and Practical	Quiz, Discussion Homework, Solve Problems
11	6	Evaluation of the Universal Gas Constant, R From Classical Physics to Quantum Theory. Bohr's Theory of the Hydrogen Atom. Quantum Numbers. Atomic Orbitals.	Quantum Theor	Theoretical and Practical	Discussion Homework, Solve Problems
12	6	Heat of Formation of Magnesium Oxide Electron Configuration. Development of the Periodic Table. Periodic Classification of the Elements. Periodic Variation in Physical Properties.	Electrons	Theoretical and Practical	Quiz, Discussion Homework, Solve Problems
13	6	UV/VIS	Ionization	Theoretical	Quiz,

		Spectroscopy and Spectrophotometry Ionization Energy.Electron Affinity Lewis Dot Symbols. The Ionic Bond. The Covalent Bond. Electro negativity.Writing LewisStructures. Formal Charge and Lewis Structures.		and Practical	Discussion Homework, Solve Problems
14	6	Spectrophotometric Analysis of Aspirin The Concept of Resonance. Exceptions to the Octet Rule. Bond Energy. Molecular Geometry.Dipole Moment.	The Concept Resonance	Theoretical and Practical	Quiz, Discussion Homework, Solve Problems
15	6	Spectrophotometric Analysis of tetracycline Valence Bond Theory. Hybridization of Atomic Orbital's. Hybridization in Molecules Containing Double and Triple Bonds. Delocalized Molecular Orbital's.	Valence Bo Theory	Theoretical and Practical	Discussion Homework, Solve Problems
16					

Course Evaluation				
Final Exam	Assignments	Quizzes	Laboratory	Term Tests
50%	9%	25%	6%	10%

Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	Chang R. & College W. ,Chemistry, McGraw Hill 9th ed., 2007
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name:
Engineering Drawing
Course Code:
ENG001
Semester / Year:
Second semester/ 2023-2024
Description Preparation Date:
This is second course in a one-semester series of engineering drawing based on teaching students both manual computer-based engineering drawing to meet needs of students majoring in engineering. The course is a survey main concepts, principles, methods and results of traditional engineering drawing. Primarily, course covers princi of engineering drawing, and its topics include: how to use drawing tools, types of lines, engineering operati drawing standard geometric shapes such as pentagons, hexagons, and octagons, drawing isometrics, and geome sections. This applies to hand drawing. As for drawing on the computer in laboratory using AutoCAD program introducing its most important instructions with practical application.
Available Attendance Forms:
Official Attendance
Number of Credit Hours (Total) / Number of Units (Total)
150
Course administrator's name (mention all, if more than one name)
Name: Dr. Ahmed Adnan Email:
Course Objectives
Course Objectives -Recognize the value of engineering graphics as a language of communication. - Infer the nature of engineering graphics, the relationships between 2D and 3D environments. - Visualize, comprehend, and deduce wide variety of objects, drawing the missing views/section views, and orthographic projections of an object. - Produce three dimensional drawings utilizing CAD software.

Course structure:

Evaluation method	Teaching method	outcomes Name of unit/course or subject	Required learning	Hours	Week
Discussion, quick exam, problem solving, homework	practical	1-7	Introduction: graphic language, standards, instruments, letters…etc	3	First.
Discussion, quick exam, problem solving, homework	practical	1-7	Basics for interpreting drawings, line types, types of drawings and sketches	3	Second.

Discussion, quick exam, problem solving, homework	practical	1-7	Rules for using calipers to draw circles	3	Third.
Discussion, quick exam, problem solving, homework	practical	1-7	Engineering processes and their application for drawing geometric shapes	3	Fourth.
Discussion, quick exam, problem solving, homework	practical	1-7	Applications on the computer using the AutoCAD program	3	Fifth.
Discussion, quick exam, problem solving, homework	practical	1-7	Orthographic views. Deducing front, top, and side views from a pictorial	3	Sixth.
Discussion, quick exam, problem solving, homework	practical	1-7	Dimensioning and Drawing Scale	3	Seventh
Discussion, quick exam, problem solving, homework	practical	1-7	Applications on the computer using the AutoCAD program	3	Eighth.
Discussion, quick exam, problem solving, homework	practical	1-7	Sectional views: full and half sections	3	Ninth.
Discussion, quick exam, problem solving, homework	practical	1-7	Applications on the computer using the AutoCAD program	3	Tenth.
Discussion, quick exam, problem solving, homework	practical	1-7	Applications on the computer using the AutoCAD program	3	Elevent
Discussion, quick exam, problem solving, homework	practical	1-7	Drawing a missed view from given two views	3	Twelfth
Discussion, quick exam, problem solving, homework	practical	1-7	Applications on the computer using the AutoCAD program	3	Thirteen
Discussion, quick exam, problem solving, homework	practical	1-7	Pictorial sketching: isometric and oblique	3	Fourtee
Discussion, quick exam,	practical	1-7	Applications on the computer using the AutoCAD program	3	Fifteent

problem solving, homework					
Final exam				3	Sixteen

Course Evaluation
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

1. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Engineering Drawing/Abdul-Rasool AlKhaf
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name:
Crimes of Baath
Course Code:
UOA 005
Semester / Year:
First semester/2024-2025
Description Preparation Date:
2014م11/14
Available Attendance Forms:
Official Attendance
Number of Credit Hours (Total) / Number of Units (Total)
30
Course administrator's name (mention all, if more than one name)
Name: Email:
Course Objectives
Course Objectives1- Answering several questions: What do we study? Why do we study? How do we study this subject? 2- The student will be familiar with the concept of crime at the international and national levels. 3- Identify the crimes committed by the former regime against Iraqis. With an explanation of the types of these crimes.
Teaching and Learning Strategies
Strategy -Evaluating students individually by giving them an opportunity to participate in the class by answering questions. -Evaluating students collectively through daily exams with questions related to the daily and previous subjects. -Evaluating students collectively by giving extracurricular assignments, such as writing reports or doing assignments. -Monthly exams during the semester for students to evaluate their overall performance and understanding of the subject.

-Final exams for the first round.

Course Structure

Week	Hours	Required learning	outcomes Name of unit/course or subject	Teaching method	Evaluation method
Seventeenth	2	Learn about Baath crimes according to Iraqi criminal law	Baath crimes according to the Iraqi Criminal Court law	Lecture,	, question and answer
Eighteenth.	2	To distinguish between a concept and its subdivisions	The concept of crimes and their types	Lecture,	, question and answer
Nineteenth.	2	To clarify terminology and language	Definition of crime in language and terminology	Lecture,	, question and answer
Twentieth.	2	Sections upon sections	Crime departments	Lecture,	, question and answer
Twenty-firs	2	Ruler of international language types	Types of international crimes	Lecture,	, question and answer
Twenty-sec	2	He will order judicial power from the judiciary	Decisions issued by the criminal court	Lecture,	, question and answer
Twenty-thi	2	What is needed at the popular level, most notably the Baath forces	Psychological and social crimes and the most prominent violations of the Baath Party	Lecture,	, question and answer
Twenty-fou	2	To identify psychological crimes	Psychological crimes	Lecture,	, question and answer
Twenty-fift	2	To learn about the mechanisms of psychological crimes	Mechanisms of psychological crimes	Lecture,	, question and answer
Twenty-sixt	2	To learn about presenting documents for genocide crimes	Symbolic classification of extermination graves	Lecture,	, question and answer
Twenty-sev	2	To learn about the presentation of criminal court decisions	View documents for genocide crimes	Lecture,	, question and answer
Twenty-eig	2	To learn about the accusations leveled against Saddam and his aides	View criminal court decisions	Lecture,	, question and answer
Twenty-nin	2	Watch and display video documents of crimes	The accusations leveled against Saddam and his aides	Lecture,	, question and answer
Thirtieth.	2	Watch and display video documents of crimes	Show photographic documents of crimes	Lecture,	, question and answer
Thirty-first	2	To learn about presenting documents for genocide crimes	Show photographic documents of crimes	Lecture,	, question and answer
Thirty-seco	2	To learn about some decisions of political violations	Some decisions of political violations	Lecture,	, question and answer
Thirty-thir	2	To learn about prison and detention locations	Prison and detention places	Lecture,	, question and answer
Thirty-four	2	To learn about the environmental crimes of the Baath regime	Environmental crimes of the Baath regime	Lecture,	, question and answer
Thirty-fifth	2	To learn about military pollution	Military pollution	Lecture,	, question and answer
Thirty-sixth	2	To learn about the	Destruction of cities and	Lecture,	, question and

		destruction of cities and villages	villages		answer
		2nd Course Exam			

Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	**جرائم نظام البعث في العراق**
Main references (sources)	**أرشيف مؤسسة السجناء السياسيين**
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	**المركز العراقي لتوثيق جائم التطرف /** **https://iraqicenter-fdec.org/archives/9277**

Course Description Form

Course Name: English Language I
Course Code: UOA003
Semester / Year:2nd semester/2024-2025
Description Preparation Date:26/12/2024
Available Attendance Forms: Official Hours Work
Number of Credit Hours (Total) / Number of Units (Total) 30/2
Course administrator's name (mention all, if more than one name)
Name: Dr.Haitham Zeddan Hussein Email: haithamz1978@uoanbar.edu.iq
Course Objectives
Course Objectives • Develop academic writing proficiency and critical thinking skills. • Students are able to conduct effective searches of printed and electronic resources • Students can use external sources to support ideas in an academic writing in Dams and wa resources engineering.
Teaching and Learning Strategies
Strategy 1- Listening Skills:

- Improve understanding of spoken English in various contexts.
- Enhance the ability to comprehend different accents and speech patterns.
- Develop strategies for effective note-taking during listening exercises.

2- Speaking Skills:

- Foster confident and fluent spoken communication.
- Expand vocabulary for expressing ideas and opinions.
- Practice engaging in discussions, debates, and presentations on diverse topics.

3- Reading Skills:

- Strengthen comprehension skills with a focus on authentic texts.
- Expand vocabulary through exposure to a range of written materials.
- Develop critical reading skills to analyze and interpret information.

4- Writing Skills:

- Refine writing proficiency through structured and creative exercises.
- Improve grammar and sentence structure for clearer expression.
- Explore various types of writing, including essays, reports, and emails.

5- Grammar and Vocabulary:

- Consolidate and expand on previously learned grammar concepts.
- Introduce new grammatical structures and vocabulary relevant to daily communication.
- Foster the ability to use language accurately and appropriately.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2	1-7	Grammar (Present, past, and future tenses, Questions & questions words)	Theoretical	Discussion, quick exam, problem solving, homework
2	2	1-7	Vocabulary (Parts of speech, Words with more than one meaning)	Theoretical	Discussion, quick exam, problem solving, homework
3	2	1-7	Everyday English (Social expressions I)	Theoretical	Discussion, quick exam, problem solving, homework
4	2	1-7	Reading (people, the main communicators'- the many ways we communicate)	Theoretical	Discussion, quick exam, problem solving, homework
5	2	1-7	Speaking (Information gap, Discussion, Role-play)	Theoretical	Discussion, quick exam, problem solving, homework

6	2	1-7	Listening (Neighbors)	Theoretical	Discussion, quick exam, problem solving, homework
7	2	1-7	Writing (Informal Letter)	Theoretical	Discussion, quick exam, problem solving, homework
8	2	1-7	Grammar (Present tenses)	Theoretical	Discussion, quick exam, problem solving, homework
9	2	1-7	Vocabulary (Describing countries, Collocation-Daily life)	Theoretical	Discussion, quick exam, problem solving, homework
10	2	1-7	Everyday English (Making Conversation)	Theoretical	Discussion, quick exam, problem solving, homework
11	2	1-7	Reading (Living in the USA)	Theoretical	Discussion, quick exam, problem solving, homework
12	2	1-7	Speaking (Information gap, Exchanging information about immigrants to the USA)	Theoretical	Discussion, quick exam, problem solving, homework
13	2	1-7	Listening (“You drive me mad”, but I love you)	Theoretical	Discussion, quick exam, problem solving, homework
14	2	1-7	Writing (Linking words, Describing a person)	Theoretical	Discussion, quick exam, problem solving, homework
15	2	1-7	Grammar (Past tenses)	Theoretical	Discussion, quick exam, problem solving, homework

Course Evaluation:	
1- Monthly exams: 25% 2- Mid exams: 10% 3- Homework: 10% 4- Commitment to working hours + daily participation: 5% 5- Final exam: 50%	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	John & Liz Soars, "New Headway Plus- Beginner Students", the Fourth Edition, Intermediate Level, Oxford University Press,2014
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

Course Name: Engineering Statistics
Course Code: DWE 3213
Semester / Year: First semester/ 2024-2025
Description Preparation Date: 26/12/2024
Available Attendance Forms: Official working hours
Number of Credit Hours (Total) / Number of Units (Total): 2 /45
Course administrator's name (mention all, if more than one name)
Name: Ibtihal A. Mawlood & Aseel Abdaljader Email: ibtihal.maoloud@uoanbar.edu.iq
Course Objectives
Course Objectives A- Teaching the student to classify data, graphical representation, and mathematical

description of it.

B- Probability theory, its rules, random variables, and probability distributions.

C- Random variables, normal distribution, independence of random variables, and their statistical details.

D- Increasing the student's intellectual awareness to deal with recurring engineering problems facing his work and devising solutions by benefiting from the repetition of these problems

Teaching and Learning Strategies

Strategy

1. Differentiating between a random process and a deterministic process, dealing with data samples and analyzing them using several metrics and presenting them graphically.
2. Learn about probability theory and its applications, and dealing with discrete and continuous random variables.
3. Linking the normal distribution with the statistical sample population in practice and designing good estimates for different criteria for different statistical populations.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First.	3	General definition of the topic	Introduction, Data Summary and Presentation	**Theoretical**	Discussion, quick exam, problem solving, homework
Second.	3	Knowledge and understanding	Probability: Addition rule, conditional probability, multiplication rule and Bayes Theorem.	**Theoretical**	Discussion, quick exam, problem solving, homework
Third.	3	Design considerations	Discrete random variables. Probability mass function. Mean and variance of discrete random variables.	**Theoretical**	Discussion, quick exam, problem solving, homework
Fourth.	3	Knowledge and understanding	Probability Distribution functions: Uniform, Binomial, Geometric and Negative Binomial, Hyper-geometric and Poisson Distribution.	**Theoretical**	Discussion, quick exam, problem solving, homework
Fifth.	3	Design considerations	Continuous random variables. Probability Density functions.	**Theoretical**	Discussion, quick exam, problem solving, homework
Sixth.	3	Knowledge and understanding	Normal Distribution. Approximation to Binomial and Poisson Distribution.	**Theoretical**	Discussion, quick exam, problem solving, homework
Seventh.	3	Exam and review	Monthly exam	**Theoretical**	Discussion, quick exam, problem solving, homework
Eighth.	3	Scoop, understand and design	Exponential distribution. Other continuous distributions.	**Theoretical**	Discussion, quick exam, problem solving,

					homework
Ninth.	3	Design considerations	Joint probability function. Multiple discrete and continuous random variables.	**Theoretical**	Discussion, quick exam, problem solving, homework
Tenth.	3	Design considerations	Covariance and correlation. Bivariate Normal Distribution. Linear combination of random variables. Functions of random variables.	**Theoretical**	Discussion, quick exam, problem solving, homework
Eleventh	3	Knowledge and understanding	Parameter estimation. Properties of estimators. Method of Moments.	**Theoretical**	Discussion, quick exam, problem solving, homework
Twelfth.	3	Knowledge and understanding	Method of Maximum likelihood.	**Theoretical**	Discussion, quick exam, problem solving, homework
Thirteen	3	Knowledge and understanding	Interval estimation. Inference on the mean of a population: variance known or unknown. Inference on the variance of a normal population	**Theoretical**	Discussion, quick exam, problem solving, homework
Fourteen	3	Design and cognitive considerations	Hypothesis testing about the mean and Proportion: Small and Large Sample	**Theoretical**	Discussion, quick exam, problem solving, homework
Fifteenth	3	General examination and review	Hypothesis testing: Two Populations	**Theoretical**	Discussion, quick exam, problem solving, homework
Sixteent	3	2nd Course Exam			

Course Evaluation:

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc
1- Monthly exams: 20%
2- Daily exams: 10%
3- Duties: 5%
4- Commitment to working hours + daily participation: 5%
5-Mid exam : 10%
5- Final exam: 50%

Learning and Teaching Resources

Required textbooks (curricular boo if any)	•William Mendenhall and Terry Sincich, Statistics Engineering and the Sciences, Prentice Hall, 5th ed., 2007
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

Course Name:
Dynamics
Course Code:
DWR 007
Semester / Year:
2024/2025
Description Preparation Date:
25/12/2024
Available Attendance Forms:
Number of Credit Hours (Total) / Number of Units (Total)
150. 6 units
Course administrator's name (mention all, if more than one name)
Name: Lec. Hend Saad Zayan Email: hind.saad@uoanbar.edu.iq
Course Objectives
Course Objectives The goal of this course is to develop the ability in students to evaluate fundamental engineer problems in a simple manner by creating free body diagrams and to determine the dynamic behavio structures by utilizing equilibrium principles under dynamic loading conditions, as well as equilibri equations based on these principles.
Teaching and Learning Strategies
Strategy The main strategy that will be adopted in delivering this module is to encourage students' participat in the exercises, while at the same time refining and expanding their critical thinking skills. This will achieved through classes, interactive tutorials and by considering types of simple experiments involv some sampling activities that are interesting to the students.
Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	1	**Basic Concepts** Concepts of space, time, m velocity, acceleration and fo Scalar and vector quanti Newton's law of motion, Law gravitation.	Theoretically	Quizzes+H.W
2	4	1	**Kinematics of a Particle** Rectilinear Motion, Curvili Motion – Rectangular Coordina Projectile Motion.	Theoretically	Quizzes+H.W
3	4	1	**Kinematics of a Particle** Curvilinear Motion – Normal	Theoretically	Quizzes+H.W

			Tangential Coordinates, Curvili Motion – Polar Coordinates.		
4	4	1	**Kinematics of a Particle** Relative Motion, Constrained Mo of Particles.	Theoretically	Quizzes+H.W
5	4	1	**Kinetics of Particles: Force & Acceleration** Newton's 2nd Law, Equations Motion.	Theoretically	Quizzes+H.W
6	4	1	**Kinetics of Particles: Force & Acceleration** Rectangular Coordinates.	Theoretically	Quizzes+H.W
7	4	1	**Kinetics of Particles: Force & Acceleration** Normal & Tangential Coordinates	Theoretically	Quizzes+H.W
8	4	1	**Mid-term Exam1**	Theoretically	Quizzes+H.W
9	4	1	**Chapter 4: Kinetics of Particles: Work & Energy** Work of a Force, Work & Energy	Theoretically	Quizzes+H.W
10	4	1	**Chapter 4: Kinetics of Particles: Work & Energy** Potential Energy.	Theoretically	Quizzes+H.W
11	4	1	**Kinetics of Particles: Impulse & Momentum** Linear Impulse & Momentum.	Theoretically	Quizzes+H.W
12	4	1	**Kinetics of Particles: Impulse & Momentum** Angular Momentum.	Theoretically	Quizzes+H.W
13	4	1	**Mid-term Exam2**	Theoretically	Quizzes+H.W
14	4	1	**Kinetics of Particles: Impulse & Momentum** Angular Impulse & Momentum.	Theoretically	Quizzes+H.W
15	4	1	**Basic Concepts** Concepts of space, time, m velocity, acceleration and fo Scalar and vector quanti Newton's law of motion, Law gravitation.	Theoretically	Quizzes+H.W
			Preparing to final exam		

Course Evaluation	
40+mid term=10	
Learning and Teaching Resources	
Required textbooks (curricular books, if an	Engineering mechanics dynamics (6th edition) j. l. meria l. g. kraige.
Main references (sources)	Engineering Mechanics: Dynamics, 15th edit Russell C. Hibbeler.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

Course Name: Fundamentals of Electrical Engineering
Course Code: DWE1212
Semester / Year: First semester/ 2024-2025
Description Preparation Date: 28/12/2024
Available Attendance Forms: Traditional class/ Blendeds
Number of Credit Hours (Total): 3 / Number of Units (Total):60
Course administrator's name (mention all, if more than one name)
Name: Dr. Ahmed Shakir Abdullah Email: ahmed.s.abd@uoanbar.edu.iq
Course Objectives
Course Objectives **The goals of this course are to enable students to:-** • **To develop problem solving skills and understanding the fundamentals of electrical engineer through the application of techniques.** • **To be able to solve series and parallel DC circuit.** • **To be able to understand Ohms Kirchhoff's current and voltage Laws problems.** • **To be able to analyze Nodal analysis, Mesh analysis, Source transformation.** • **To perform mesh and Nodal analysis.** • **To be able to analyze R, L, C circuit.**
Teaching and Learning Strategies
Strategy • **Sudden daily and weekly continuous tests.** • **Exercises and activities in the classroom.** • **Guiding students to some sources that contain examples and exercises to benefit from them.**
Course Structure

Week	Hours	Required Learning Outcomes	Unit	Learning method	Evaluation method
		Basic Concepts: Systems of	**Unit 1**	**Theoretical**	**General**

First	3	Units, charge and current, voltage, power and energy, circuit element, and applications.		with Discussion	questions and discussion
Second	3	Basic Laws: Ohm's Law, and nodes, branches, and loops, and Kirchhoff's Laws.	Unit 2	Theoretical with Discussion	General questions and discussion
Third	3	Basic Laws: Series Resistors and Voltage Division and Parallel Resistors and Current Division.	Unit 3	Theoretical with Discussion	Quiz 1 with general questions and discussion
Fourth	3	Wye–Delta Transformations: Delta to Wye Conversion and Wye to Delta Conversion	Unit 4	Theoretical with Discussion	Assignment 1 with general questions and discussion
Fifth	3	Methods of Analysis: Introduction, Nodal Analysis with current source, and nodal Analysis with voltage source	Unit 5	Theoretical with Discussion	Quiz 2 with general questions and discussion
Sixth	3	Methods of Analysis: Introduction, and Mesh Analysis	Unit 6	Theoretical with Discussion	General questions and discussion
Seventh	3	Midterm Exam	–	–	–
Eighth	3	Methods of Analysis: mesh Analysis with Current Sources.	Unit 7	Theoretical with Discussion	Quiz 3 with explanation and discussion
Ninth	3	Circuit Theorems: Introduction, and Linearity	Unit 8	Theoretical with	Explanation and

		Property		**Discussion**	**discussion**
Tenth	**3**	**Circuit Theorems: Source transformation**	**Unit 9**	**Theoretical with Discussion**	**Assignment 2 with general questions and discussion**
Eleventh	**3**	**Circuit Theorems: Thevenin's Theorem**	**Unit 10**	**Theoretical with Discussion**	**Quiz 4 and general questions**
Twelfth	**3**	**Thevenin circuits: Bivariate normal distribution.**	**Unit 11**	**Theoretical with Discussion**	**General questions and discussion**
Thirteenth	**3**	**Thevenin circuits: Norton's Theorem**	**Unit 12**	**Theoretical with Discussion**	**In-class assignment with explanation and discussion**
Fourteenth	**3**	**Thevenin circuits: Maximum Power Transfer**	**Unit 13**	**Theoretical with Discussion**	**Quiz 5 with general questions and discussion**
Fifteenth	**3**	**Review**	–	–	–

Course Evaluation

In-class assignment	Homework	Lab.	Quiz	Midterm exam	Final exam
5%	4%	6%	25%	10%	50%

Learning and Teaching Resources

Required textbooks (curricular books, if any)	1. Alexander and Sadiku "Fundamentals of Electric Circuits" Third Edition McGraw Hill. 2. Boylestad, R. L., Introductory Circuit Analysis (10th Edition).
Main references (sources)	

Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

Course Name: Engineering Surveying 2
Course Code: DWE 2309
Semester / Second/ Year:2024−2025
Description Preparation Date:25/12/2024
Available Attendance Forms: Attendance
Number of Credit Hours (Total) / Number of Units (Total)
80 ours distributed as follows: 5 hours per week
Course administrator's name (mention all, if more than one name)
Name: Dr. Prof. Khamis N. Sayl Email: knsayl@uoanbar.edu.iq
Course Objectives
Course Objectives • *Compute area by using different types of area computation techniques.* • *Determine volumes of various types of material and determine of quantities of water* • ∪ *Lay out different type of horizontal curve in the field with surveying equipment* •
Teaching and Learning Strategies
Strategy Theoretical + applied + electronic lectures recorded using Google Classroom with White Board in interactive manner
Course Structure

Week	Hours	Required Learning	Unit or subject name	Learning method	Evaluation method

		Outcomes			
1	5 h		TAPING ESUREMEN TS		Short exam + assignments + attendance and participation
2	5 h		Areas	ctures + actical	Short exam + assignments + attendance and participation
3	5 h		Areas	ctures + actical	Short exam + assignments + attendance and participation
4	5 h		Volumes	ctures + actical	Short exam + assignments + attendance and participation
5	5 h		Volumes	ctures + actical	Short exam + assignments + attendance and participation
6	5 h		Volumes	ctures + actical	Short exam + assignments + attendance and participation
7	5 h		Horizontal curves	ctures + actical	Short exam + assignments + attendance and participation
8	5 h		Horizontal curves.	ctures + actical	Short exam + assignments + attendance and participation
9	5 h		bal Position stem (GPS)	ctures + actical	Short exam + assignments + attendance and participation
10	5 h		bal Position stem (GPS)	ctures + actical	Short exam + ssignments 11+ 12endanceparticip ation
11	5 h		bal Position stem (GPS)	ctures + actical	Short exam + assignments + attendance and participation
12	5 h		sic principle of remote sensing	ctures + actical	Short exam + assignments + attendance and participation
13	5 h		bal Position stem (GPS)	ctures +	Short exam + assignments +

				actical	attendance and participation
14	5 h		bal Position stem (GPS)	ctures + actical	Short exam + assignments + attendance and participation
15			exam		

Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Engineering Surveying
Main references (sources)	*Elementary Surveying* *An Introduction to Geomatics*
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

Course Name: Engineering Surveying 1
Course Code: DWE 2308
Semester / First/ Year:2024-2025
Description Preparation Date:25/12/2024
Available Attendance Forms: Attendance
Number of Credit Hours (Total) / Number of Units (Total)
80 ours distributed as follows: 5 hours per week
Course administrator's name (mention all, if more than one name)
Name: Dr. Prof. Khamis N. Sayl Email: knsayl@uoanbar.edu.iq
2. Course Objectives
Course Objectives • Show the student the necessity of redundant information and methods for determining evaluating errors. • Understand the principles of leveling, measure vertical distances and apply the skills leveling. • Understand the principle of angles measurements and determine the directions. • Develop, test and calibrate of sensors, instruments and systems for the surveying purpose • . Define the importance of traverse computation in omitted measurement and compute a

of plots by using different types of area computation techniques.

3. Teaching and Learning Strategies

Strategy

Theoretical + applied + electronic lectures recorded using Google Classroom with White Board in interactive manner

4. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	5 h		TAPING MESUREMENTS		Short exam + assignments + attendance and participation
2	5 h		TAPING MESUREMENTS	Lecture + practica	Short exam + assignments + attendance and participation
3	5 h		LEVELING-THEORY AND METHODS	Lecture + practica	Short exam + assignments + attendance and participation
4	5 h		LEVELING-THEORY AND METHODS	Lecture + practica	Short exam + assignments + attendance and participation
5	5 h		LEVELING-THEORY AND METHODS	Lecture + practica	Short exam + assignments + attendance and participation
6	5 h		LEVELING-THEORY AND METHODS	Lecture + practica	Short exam + assignments + attendance and participation
7	5 h		DISTANCE MEASUREMENTS USING TACHEOMETRIC OR OPTICAL METHOD	Lecture + practica	Short exam + assignments + attendance and participation
8	5 h		DISTANCE MEASUREMENTS USING EDM	Lecture + practica	Short exam + assignments + attendance and participation
9	5 h		ANGLES, AZIMUTH, AND	Lecture + practica	Short exam + assignments + attendance and

			BEARINGS		participation
10	5 h		ANGLES, AZIMUTH, AND BEARINGS	Lecture + practica	Short exam + assignments 11+ att12endanceparti ation
11	5 h		ANGLES, AZIMUTH, AND BEARINGS	Lecture + practica	Short exam + assignments + attendance and participation
12	5 h		ANGLES, AZIMUTH, AND BEARINGS	Lecture + practica	Short exam + assignments + attendance and participation
13	5 h		TRAVERSI	Lecture + practica	Short exam + assignments + attendance and participation
14	5 h		TRAVERSI	Lecture + practica	Short exam + assignments + attendance and participation
15			exam		

5. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
6. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Engineering Surveying
Main references (sources)	*Elementary Surveying* *An Introduction to Geomatics*
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name: **CALCULUS I**
Course Code: ENG03
Semester / 1
Description Preparation Date:26-12-2024
Available Attendance Forms: Classroom presence
Number of Credit Hours (Total) / Number of Units (Total) 4
Course administrator's name (mention all, if more than one name)

Name: Dr. Ayad S. Aadi ,Mr. Mohammed T. Nawar
Email: ayad_saeed@uoanbar.edu.iq

Course Objectives

Course Objectives

- Solve problems using the Fundamental Theorem of Calculus.
- Evaluate Limits of the functions and their continuity.
- Find the derivative of algebraic, trigonometric, exponential, and logarithmic functions.
- Sketch the graph of a function using the information for the first and second derivatives
- Solve problems involving applications of integrals including finding volume of solids of revolution and area between curves

Teaching and Learning Strategies

Strategy

- Lecture and Presentation
- Solve examples, discuss and apply exercises
- Daily surprise and weekly tests
- Individual homework and report

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	4	General definitio and the formation sports models	Functions and models: four ways to represent a function, mathematical models: a catalogue of essential functions	theoretical	Homework
Second	4	Goals and calculat	new functions from old functions , exponential functions, inverse functions and logarithms		Quick Exam
Third	4	Purpose calculatic in different way	Limits: the tangent and velocity problems. The limit of a function, calculating limits using the limit laws.		Obligatory + Exam
Fourth	4	Introduction to	Continuity, limits at infinity, horizontal asymptote. Infinite limits, vertical asymptotes. derivatives and rates of change		Homework
V	4	Methods for calculating the derivative	Differentiation rules: Differentiation of Polynomials. The Product and Quotient Rules. Derivatives of Trigonometric Functions.		

Sixth	4	Additional rules derivatives	The Chain Rule, Implicit Differentiation.		
Seventh	4	The relationship of time and its issues Mid Exam	Related Rates		
Eighth	4	Applications regarding ending	Applications of differentiation: maximum and minimum values. The mean value theorem. How derivatives affect the shape of a graph		
Ninth	4	Drawing functio and their applicati	Summary of curve sketching.		
X	4	Optimization in engineering mater and applications related to specialization	Optimization . problems. Antiderivatives , Indeterminate forms and l'Hospital's rule.		
Eleventh	4	Integrals and the theory	Integrals: the definite integral. The fundamental theorem of calculus.		Discussion + Questions + Homework
Twelfth	4	Definite and indefinite integra	The indefinite integral and net change theorem. The substitution rule		Homework + Quick Exam
Thirteenth	4	Integration Applications	Applications of integrals: areas between curves. Volumes.		Obligatory + City Exam
Fourteenth	4	Sizes	Volumes by cylindrical shells. Average value of a function		Homework
Fifteenth	-	Final Exam and Assessment	Final Exam		-

7. Course Evaluation

The evaluation is based on

1. Monthly exams 20%
2. Daily 10%
3. Duties 5%
4. Daily participation in class 5%
5. Mid Exam 10%
6. Final Exam 50%

Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Calculus, Early Transcendental By James Stew 8th Edition, 2016, Cengage Learning
Recommended books and references (scientific journals, reports...)	

Electronic References, Websites	

Course Description Form

Course Name:
Calculas2
Course Code:
ENG 004
Semester / Year:
2/ First stage/2024
Description Preparation Date:
25/12/2024
Available Attendance Forms:
Classroom presence
Number of Credit Hours (Total) / Number of Units (Total)
3
Course administrator's name (mention all, if more than one name)
Name: Ghassan Subhi Jameel + Aseel Madallah Mohammed Email: aseel.mohammed@uoanbar.edu.iq
Course Objectives
Course Objectives The student must be familiar with methods for solving integrals, including complex integrals and their relationship to engineering applications in the specialty
Teaching and Learning Strategies
Strategy 1.Lecture and Presentation 2 .Daily surprise and weekly tests 3. Individual homework and report
Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	4	Methods of first integrals	Techniques of integration: Integration by Parts. Trigonometric Integrals, Trigonometric Substitution	Theoretical	Homework
Second	4	Rational functions	Integrating Rational Functions by Partial Fractions. Integrals involving roots.		Quick Exam
Third	4	Infinite integrals	Improper integrals: Types of Improper Integrals and Methods of valuation		Quick Exam

Fourth	4	To compare	Comparison Test for Improper Integrals		Homework
V	4	Integration applications	Applications of Integrals: Applications of Integrals, Arc length, Surface Area		Quick Exam
Sixth	4	Variable functions	Parametric Equations and Curves. Tangents with Parametric Equations.		Homework + Quick Exam
Seventh	4	Polar coordinates Mid Exam	Polar Coordinates Technique: Polar Coordinates Common Polar Coordinate Graphs		
Eighth	4	Tangents	Tangents with Polar Coordinates Curves defined by parametric equations		Discussion + Questions + Homework
Ninth	4	Arc length	Arc Length with Polar coordinates.		Homework + Quick Exam
X	4	Area and getting to know it	Area in Polar Coordinates		Discussion + Questions + Homework
Eleventh	4	Ratio and root in ser	Ratio and Root tests.		Discussion + Questions + Homework
Twelfth	4	Sequences and their permutations	Alternating series. Conditional convergence		Homework + Quick Exam
Thirteenth	4	Maccolerian series	Maclaurin and Taylor series and their approximation. Power series.		Exam
Fourteenth	-	Final Exam and Assessment	Final Exam		-

Course Evaluation

The evaluation is based on

7. Monthly exams 20%
8. Daily 10%
9. Duties 5%
10. Daily participation in class 5%
11. Mid Exam 10%

Final Exam 50%

Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Calculus, 8th edition (2007) by Howard Anton, (John Wiley & Sons, Inc, New York). Chapters: 7,8,10&11
Main references (sources)	None
Recommended books and references (scientific journals, reports...)	None
Electronic References, Websites	None

Course Description Form

Course Name: Groundwater Hydrology
Course Code: DWE3338
Semester / Year: Second / 2023-2024
Description Preparation Date: 3-2-2024
Available Attendance Forms: Attendance
Number of Credit Hours (Total) / Number of Units (Total):45 /6
Course administrator's name (mention all, if more than one name)
Name: Dr. Ammar Adham Ali Email: engammar2000@uoanbar.edu.iq
Course Objectives
Course Objectives **It is concerned with teaching students the basic principles of analyzing and studying groundwa hydrology (flow - wells - recharging - statistical analysis... etc.) with the aim of estimating amount of available water and planning methods of extraction and treatment or preserving a operating it, addressing issues related to the water budget and developing methods of hydrologi calculation and accuracy. Determine water discharges, predict future water discharges, a determine the size of reservoirs.**
Teaching and Learning Strategies
Strategy 1- Providing students with the basics and topics related to previous educational outcomes and the sk to solve practical problems through presentation, lecture, or conducting experiments. 2- Solving a group of practical and applied examples by the subject teacher. 3- Through discussion, students participate in solving some practical problems. 4- Daily surprise and continuous weekly tests. 5- Directing students to some websites to benefit from them.
8. Course Structure

Week	Hours	Required Learning	Unit or subject name	Learning method	Evaluation method

		Outcomes			
First	3	General Introduction	Introduction	Theory	Discussion, quick exam, problem solving, homework
Second	3	Learn Hydrology properties	Classification and types of groundwater -Basic definitions: (aquifers, Aquitard Aquiclude, AquifugeUnsaturat zone and saturated zone.)	Theory	Discussion, qu exam, probl solving, homewo
Third	3	Learn Water Balance	-Hydrologic budget and groundwater sources. -Concepts of groundwater pollut	Theory	Discussion, quicl exam, problem solving, homewo
Fourth	3	Learn Aquifers	Aquifers -Aquifers classification: (confined, unconfin and leaky)	Theory	Discussion, quicl exam, problem solving, homewo
Fifth	3	Aquifers propeties	Aquifer Parameters: (porosity, recharge and discharge, hydraulic conuctivity, transmissivity, storativity, specific yield) - Anisotropy and heterogeneity	Theory	Discussion, quicl exam, problem solving, homewo
Sixth	3	Groundwater movm	Groundwater flow - Steady state and unsteady state flow	Theory	Discussion, quicl exam, problem solving, homewo
Seventh	3	Exam	Mid-term Exam		
Eighth	3	Learn Darcy's law	-Driving forces of groundwater flow - -principles laws groundwater flow Darcy's law)	Theory	Discussion, quicl exam, problem solving, homewo
Ninth	3	Groundwater dorces	Groundwater	Theory	Discussion, quicl

			Resources Development -Exploration -Evaluation -Exploitation		exam, problem solving, homew
Tenth	3	Wells	Wells -Well Drilling Methods: - Methods of Drilli Shallow Wells:	Theory	Discussion, quic exam, problem solving, homew
Eleventh	3	Well's types	Well Completion -Placement of casing -Cementing of casing -Placement of well screen	Theory	Discussion, quic exam, problem solving, homew
Twelfth	3	Wells requirements	Requirements for Water Well Design -Limitations of dimensions and diameters of casing piping -Intake area: design of well screen, gravel pack design.	Theory	Discussion, quic exam, problem solving, homew
Thirteenth	3	Pumps	Groundwater & Pumping Tests -Steady State Radi Flow to Wells:	Theory	Discussion, quic exam, problem solving, homew
Fourteenth	3	Unsteady flow	-Unsteady State Radial Flow: Theis`s Method and its application، Jacob`s Methods	Theory	Discussion, quic exam, problem solving, homew
Fifteenth	3	Discharge measurement	-Discharge calculation from early drawdown data (Sen 1986). -Leaky Aquifers	Theory	Discussion, quic exam, problem solving, homew
Sixteenth	3		2nd Course Exam		

Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Ground water hydrology
Main references (sources)	

Recommended books and references (scientific journals, reports...)	Foundation Design – Principles and Pract Third Edition, by Donald P. Coduto, 20 Pearson Education, Inc.
Electronic References, Websites	

Course Description Form

Course Name: Engineering Hydrology
Course Code: DWE3318
Semester / Year: first / 2024-2025
Description Preparation Date: 25-12-2024
Available Attendance Forms: Attendance
Number of Credit Hours (Total) / Number of Units (Total):45 /6
Course administrator's name (mention all, if more than one name)
Name: Dr. Ammar Adham Ali Email: engammar2000@uoanbar.edu.iq
Course Objectives
Course Objectives It is concerned with teaching students the basic principles of analyzing and studying the stages of water cycle in nature (precipitation - flow - evaporation - storage) with the aim of estimating the amo of available water and planning and operating water facilities. Addressing issues related to the wa budget, developing hydrological calculation methods, accurately determining water discharg forecasting future water discharges, and determining the size of reservoirs to meet needs. Drinki irrigation and drying time.
Teaching and Learning Strategies
Strategy 1- Providing students with the basics and topics related to previous educational outcomes and the sk to solve practical problems through presentation, lecture, or conducting experiments. 2- Solving a group of practical and applied examples by the subject teacher. 3- Through discussion, students participate in solving some practical problems. 4- Daily surprise and continuous weekly tests. 5- Directing students to some websites to benefit from them.
Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	3	General Introduction	Introduction	Theory	Discussion, quick exam, problem solving, homework
Second	3	Learn Hydrology properties	Hydrologic cycle return periods an water balance	Theory	Discussion, qu exam, probl solving, homewor

Third	3	Learn Hydrology properties	Precipitation, typ of precipitation a stream flow measurements	Theory	Discussion, quick exam, problem solving, homewor
Fourth	3	Data Analysis	Estimation of missed data, checking data consistency & Rainfall frequenc analysis	Theory	Discussion, quick exam, problem solving, homewor
Fifth	3	Analysis and Design	Theory of frequency analys for design storms and design floods	Theory	Discussion, quick exam, problem solving, homewor
Sixth	3	Analysis and Design	Measurement of evaporation and estimation of potential evaporation	Theory	Discussion, quick exam, problem solving, homewor
Seventh	3	Exam	Mid-term Exam		
Eighth	3	Properties measurement	Infiltration, Fact affecting infiltration, Measurement an estimation of infiltration proce	Theory	Discussion, quick exam, problem solving, homewor
Ninth	3	Properties measurement	Hydrographs, Introduction and Unit Hydrograph	Theory	Discussion, quick exam, problem solving, homewor
Tenth	3	Hydrology Applicati	Hydrograph application, Tim Area Models and	Theory	Discussion, quick exam, problem solving, homewor
Eleventh	3	Analysis and Design	Synthetic Unit Hydrographs	Theory	Discussion, quick exam, problem solving, homewor
Twelfth	3	General Introduction	Channel Intake a Flood routing: channel & reservoir routing	Theory	Discussion, quick exam, problem solving, homewor
Thirteenth	3	Hydrology applicatio	Applications of binominal distribution for defining the retu period in engineering desi	Theory	Discussion, quick exam, problem solving, homewor
Fourteenth	3	Statistical applicatio	Normal distribution and application and relationship to	Theory	Discussion, quick exam, problem solving, homewor
Fifteenth	3	Statistical applicatio	hydraulic design	Theory	Discussion, quick

					exam, problem solving, homewor
Sixteenth	3		2nd Course Exa		

9. Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	1- Warren vissman , Introduction to hydrology, 5th ed, 2003.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	1- Ven Te Chow, Applied hydrology. 2- Em. Wilson, Engineering hydrology.
Electronic References, Websites	

Course Description Form

Course Name: Design of Dams
Course Code: DWR020
Semester / Year: 1/2024
Description Preparation Date: 25/12/2024
Available Attendance Forms: in-person
Number of Credit Hours (Total) / Number of Units (Total) 150/6
Course administrator's name (mention all, if more than one name)
Name: Dr. Ammar H. Kamel & Dr. Rafid S.Rashid Email: *rafid.alboresha@uoanbar.edu.iq*
Course Objectives
Course Objectives 1. To impart the principles of analysis, design, and behavior of dam and hydraulic structures belong to it. 2. To enable the student how to choose the suitable type of dams and how to select the perfect

site to construct the dam.

3. Familiarity with professional and contemporary issues.

Teaching and Learning Strategies

Strategy

Combining theoretical understanding with real-world applications, like case studies completed dams and simulations, is one way to learn in a dam design course. Empha should also be placed on problem-solving, and understanding environmental, structural, hydrological considerations

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	1,2	Introduction: Important Ter for The main Pa of Dam, Plann Consideration, Classification Dams and Fact Governing Selection Site Dams.-		homewo
2		2	Flood Hydrolo for Des Purposes		Quiz, homewo
3		2,6	Estimation design flood		homewo
4		2	Gravity Dams -		homewo
5			Gravity Dams		quiz
6			Exam1		
7			Concrete A Dams - I		homewo
8			Concrete A Dams - II		quiz
9			Buttress Dams		homewo
1			Exam 2		
1			Earth Dams - I		homewo
1			Earth Dams – I		quiz
1			Rock fill		homewo
			Exam3		
1			Preparatory w before the fi Exam		
1					

Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources)	Hydraulic Structures,

	P. Novak, A.I.B. Moffat and C. Nalluri School of Civil Engineering & Geosciences, University of Newcastle upon Tyne, UK And R. Narayanan
Recommended books and references (scientific journals, reports...)	Formerly Department of Civil and Structural Engineering, UMIST, University of Manchester, UK Fourth edition published 2007 by Taylor & Francis
Electronic References, Websites	

Course Description Form

Course Name: **Calculus-4**
Course Code: **DWE2212**
Semester / Year: 1/2024
Description Preparation Date: 25/12/2024
Available Attendance Forms: in-person
Number of Credit Hours (Total) / Number of Units (Total) 150/6
Course administrator's name (mention all, if more than one name)
Name: Dr. Muhannad Haqi Email: *muhannad_dosary@uoanbar.edu.iq*
Course Objectives
Course Objectives 1- Differential Equations: Solve ordinary differential equations (ODEs) and partial differential equations (PDEs). Apply techniques such as separation of variables, exact equations, and integrating factors. 2- Series and Sequences: Analyze sequences and series, including convergence tests. Understand and apply Taylor and Maclaurin series expansions. **3-** Applications: Apply calculus concepts to solve real-world problems in physics, engineering, and other fields. Use calculus to model and analyze dynamic systems.
Teaching and Learning Strategies
Strategy Developing a strategy for succeeding in Calculus 4, especially for engineering stude involves a combination of understanding advanced mathematical concepts and applying th to real-world engineering problems. Here's a comprehensive strategy to excel in this cou Engage with practical projects or case studies that involve calculus.

Course Structure					
Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3		use separation of variables to solve differential equations, solve exact differential equations		Homewor Quizzes
2	3		use variation of parameters to solve differential equations, solve first-order linear differential equations		Homewor Quizzes
3	3		Bernoulli equation, Application of First Order Differential Equations		Homewor Quizzes
4	3		Higher order Differential Equations Solutions of Homogeneous Linear D.E with constant coefficients Solutions of Inhomogeneous Linear D.E with constant coefficients		Homewor Quizzes
5	3		The Method of Undetermined Coefficients Method of Variation of Parameters The Euler-Cauchy Differential Equations		Homewor Quizzes
6	3		Reduction of Order Applications of Higher Order Differential Equations		Homewor Quizzes
7	3		Simultaneous Linear Differential Equations Elimination of dependant variables by differentiation		Homewor Quizzes
8	3		Elimination of dependant variables using operator equation Solution by Cramer rule		Homewor Quizzes
9	3		Fourier Series: Periodic functions Trigonometric series Bounds of a Function		Homewor Quizzes
10	3		Continuity of a Function Euler Coefficients Even and Odd Functions		Homewor Quizzes
11	3		Half Range Expansion Applications		Homewor Quizzes
12	3		Laplace Transforms		Homewor

			Properties of Laplace Transforms Inverse of Laplace transforms		Quizzes
13	3		Solution of Ordinary D.E's by Laplace transforms D.E's with constant coefficients		Homewor Quizzes
14	3		D.E's with variable coefficients: Solution of Simultaneous Linear D.E's by Laplace transforms		Homewor Quizzes
15	3				

Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
10. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	Fundamentals of Differential Equations bou with IDE CD (5th Edition) by Nagle, Saff a Snider
Recommended books and references (scientific journals, reports...)	Advanced Engineering Mathematics by Erv Kreyszig, 10th Edition.
Electronic References, Websites	

Course Description Form

Course Name:
Calculas2
Course Code:
ENG 004
Semester / Year:
2/ First stage/2024
Description Preparation Date:
25/12/2024
Available Attendance Forms:
Classroom presence
Number of Credit Hours (Total) / Number of Units (Total)
3
Course administrator's name (mention all, if more than one name)
Name: Ghassan Subhi Jameel + Aseel Madallah Mohammed Email: aseel.mohammed@uoanbar.edu.iq
Course Objectives
Course Objectives The student must be familiar with methods for solving integrals, including complex integrals and their relationship to engineering applications in the specialty
Teaching and Learning Strategies

Strategy

.1.Lecture and Presentation

2 .Daily surprise and weekly tests

3. Individual homework and reports

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	4	Methods of first integrals	Techniques of integration: Integration by Parts. Trigonometric Integrals, Trigonometric Substitution	Theoretical	Homework
Second	4	Rational functions	Integrating Rational Functions by Partial Fractions. Integrals involving roots.		Quick Exam
Third	4	Infinite integrals	Improper integrals: Types of Improper Integrals and Methods of valuation		Quick Exam
Fourth	4	To compare	Comparison Test for Improper Integrals		Homework
V	4	Integration applications	Applications of Integrals: Applications of Integrals, Arc length, Surface Area		Quick Exam
Sixth	4	Variable functions	Parametric Equations and Curves. Tangents with Parametric Equations.		Homework + Quick Exam
Seventh	4	Polar coordinates Mid Exam	Polar Coordinates Technique: Polar Coordinates Common Polar Coordinate Graphs		
Eighth	4	Tangents	Tangents with Polar Coordinates Curves defined by parametric equations		Discussion + Questions + Homework
Ninth	4	Arc length	Arc Length with Polar coordinates.		Homework + Quick Exam
X	4	Area and getting to know it	Area in Polar Coordinates		Discussion + Questions + Homework

Eleventh	4	Ratio and root in ser	Ratio and Root tests.		Discussion + Questions + Homework
Twelfth	4	Sequences and their permutations	Alternating series. Conditional convergence		Homework + Quick Exam
Thirteenth	4	Maccolerian series	Maclaurin and Taylor series and their approximation. Power series.		Exam
Fourteenth	-	Final Exam and Assessment	Final Exam		-

Course Evaluation
The evaluation is based on 12. Monthly exams 20% 13. Daily 10% 14. Duties 5% 15. Daily participation in class 5% 16. Mid Exam 10% Final Exam 50%

Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Calculus, 8th edition (2007) by Howard Anton, (John Wiley & Sons, Inc, New York). Chapters: 7,8,10&11
Main references (sources)	None
Recommended books and references (scientific journals, reports...)	None
Electronic References, Websites	None

Course Description Form

Course Name:
Design and Evaluation of on – Farm Irrigation Systems
Course Code:
DWE4332
Semester / Year:
First semester/ 2024-2025
Description Preparation Date:
2024\12\25
Available Attendance Forms:
Weekly meeting
Number of Credit Hours (Total) / Number of Units (Total)
45

Course administrator's name (mention all, if more than one name)
Name: Dr. Atheer Saleem Almawla Email: eng.atheer84@uoanbar.edu.iq
Course Objectives
Course Objectives • Understand the practical concepts of irrigation systems and their interaction with soil and crop. • Apply the knowledge of irrigation to design and evaluation of irrigation systems in addition to evaluation of better method for crops.
Teaching and Learning Strategies
Strategy design and evaluation of on – farm irrigation systems courses require effective learning and teaching strategies to ensure students develop a strong understanding of complex concepts and their practical applications. This strategy 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 Field visit to some field in governorate.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Introduction irrigation , type irrigation irrigation systen	Introduction irrigation , ty of irrigation irrigation syste	Theoretical	Quiz and discussion
2	3	soil-water-plant relationships.	soil-water-plan relationships.	Theoretical	Quiz and discussion
3	3	Irrigation w requirements system capacity	Irrigation w requirements system capacity	Theoretical	Quiz and discussion
4	3	Types of irriga systems and t selection criteri	Types of irriga systems and t selection criteri	Theoretical	Quiz and discussion
5	3	Performance criteria irrigation systen	Performance criteria irrigation syste	Theoretical	Quiz and discussion
6	3	Principles pressurized irrigation systen	Principles pressurized irrigation syste	Theoretical	Quiz and discussion
7	3	Mid exam	Mid exam	Theoretical	Quiz and discussion
8	3	Sprinkler irriga design of fixed hand m systems.	Sprinkler irrigation des of fixed and h move systems.	Theoretical	Quiz and discussion
9	3	Pumps and sys curves (design pumping units).	Pumps and sys curves (design pumping units)	Theoretical	Quiz and discussion
10	3	Design of s move (Pivot Lateral) sprin irrigation systen	Design of s move (Pivot Lateral) sprin irrigation syste	Theoretical	Quiz and discussion
11	3	Trickle irriga	Trickle irriga	Theoretical	Quiz and

		design .	design .		discussion
12	3	Trick irriga operation	Trick irriga operation	Theoretical	Quiz and discussion
13	3	Precision Irriga concepts application.	Precision Irrigation conc and application	Theoretical	Quiz and discussion
14	3	Surface irriga systems – des principles.	Surface irriga systems – des principles.	Theoretical	Quiz and discussion
15	3	Introduction irrigation , type irrigation irrigation syste	Introduction irrigation , ty of irrigation irrigation syste	Theoretical	Quiz and discussion
16		Final ex			

Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Irrigation system engineering by Ahmed hashe university of Mosel
Main references (sources)	Hoffman, G.J., R.G. Evans, M.E. Jensen, D.L. Martin, and R.L. Elliott. (2007). Design and Operation of Farm Irrigation Systems. 2nd Ed., ASABE, St. Joseph, MI, 1040 pp. ISBN: 1-892769-64-6.
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name: Engineering Numerical Methods
Course Code: DWE3214
Semester / Year: Autumn 2024/2025
Description Preparation Date: 25/12/2024
Available Attendance Forms: Class
Number of Credit Hours (Total) / Number of Units (Total) 3/3
Course administrator's name (mention all, if more than one name)
Name: Dr. Zaid M. Kani Email: zaid.kani@uoanbar.edu.ia
Course Objectives
Course Objectives 1. Be aware of the mathematical background for the different numerical methods introduced in

the course.
2. Understand the different numerical methods to solve non-linear algebraic equations and to solve system of linear equations.
3. Understand the different numerical methods for interpolation, differentiation, integration.
4. Using appropriate numerical methods to determine approximate solutions to ordinary and partial differential equations.
5. Understand how numerical methods afford a means to generate solutions in a manner that can be implemented on digital computers.
6. Use the built-in functions in MATLAB and EXCEL in addition to acquiring basic knowledge in creating MATLAB functions for solving numerical engineering problems.
7. Work on multidisciplinary projects.

Teaching and Learning Strategies

Strategy

1. Provide students with the basics and subjects related to pre-skilled education outcomes to solve practical problems by giving, lecture or experimenting.
2. Solving a set of practical and applied examples by the teacher of the subject.
3. Through discussion, students' participation is done by solving some practical problems.
4. Continuous daily sudden and weekly tests.

Guide students to certain websites to benefit from them.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	2+3	1	Introduction	Theory + Lab	Discussion, quick exam, problem solving, homework
2	2+3	2,5,6	Error analysis	Theory + Lab	Discussion, quick exam, problem solving, homework
3	2+3	2,5,6	Roots of non-linear equations	Theory + Lab	Discussion, quick exam, problem solving, homework
4	2+3	2,5,6	Systems of Linear Algebraic Equations	Theory + Lab	Discussion, quick exam, problem solving, homework
5	2+3	3,5,6	Systems of Linear Algebraic Equations	Theory + Lab	Discussion, quick exam, problem solving, homework
6	2+3	3,5,6,7	Differentiation, interpolation and Curve fitting	Theory + Lab	Discussion, quick exam, problem solving, homework

7	2+3	4,5,6,7	One-Dimensional Initial Value Problem	Theory + Lab	Discussion, quick exam, problem solving, homework
8	2+3	4,5,6,7	One-Dimensional Initial Value Problem	Theory + Lab	Discussion, quick exam, problem solving, homework
9	2+3	4,5,6,7	One-Dimensional Boundary Value Problem	Theory + Lab	Discussion, quick exam, problem solving, homework
10	2+3	4,5,6,7	One-Dimensional Boundary Value Problem	Theory + Lab	Discussion, quick exam, problem solving, homework
11	2+3	4,5,6,7	One-Dimensional Boundary Value Problem	Theory + Lab	Discussion, quick exam, problem solving, homework
12	2+3	4,5,6,7	One-Dimensional Boundary Value Problem	Theory + Lab	Discussion, quick exam, problem solving, homework
13	2+3	4,5,6,7	Partial Differential Equations	Theory + Lab	Discussion, quick exam, problem solving, homework
14	2+3	4,5,6,7	Partial Differential Equations	Theory + Lab	Discussion, quick exam, problem solving, homework
15	2+3	4,5,6,7	Partial Differential Equations	Theory + Lab	Discussion, quick exam, problem solving, homework
16	There is no week 16 in the academic calendar				

Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

1- Monthly exams: 20%
2- Daily exams: 10%
3- Homework: 5%
4- Commitment to working hours + daily participation: 5%

5- Lab 10% 6- Final exam: 50%	
Learning and Teaching Resources	
Required textbo (curricular books, any)	
Main referen (sources)	- Numerical Methods for Engineers, S. C. Chapra and R. P Canale, McGraw-Hill, 6th edition 2010. - Numerical Methods for Engineers and Scientists by Joe D. Hoffman, 2nd Edition. - Lectures on Numerical Analysis by Dennis Deturck and Herbert S. Wilf. - Numerical Analysis Using MATLAB® and Excel® by Steven T. Karris, 3rd Edition. - Numerical Methods in Engineering with MATLAB® by Jaan Kiusalaas. - Engineering Analysis- Interactive Methods and Programs with FORTRAN, QuickBasic, MATLAB, and Mathematica by Y. C. Pao. -التحليل الهندسي والعددي التطبيقي د. حسن مجيد حسون الدلفي ومحمود عطا الله مشكو
Recommended books and references (scientific journals, reports...)	
Electronic Referen Websites	

Course Description Form

Course Name: **Safety and Operation of Dams**
Course Code: **DWE4333**
Semester / Year: Semester II/Fourth academic year
Description Preparation Date: 25/12/2024
Available Attendance Forms: Official working hours
Number of Credit Hours (Total) / Number of Units (Total): 60/3
Course administrator's name (mention all, if more than one name)
Name: Dr. Ammar Heteam and Dr. Mohammed Falah Allawi Email: mohammed.falah@uoanbar.edu.iq
Course Objectives
Course Objectives • To develop problem solving skills and understanding of Dams operation application and safety of dams. • To understand and establish its relevance in civil engineering. • This is addressing issues related to water balance and developing hydraulic calculation methods and accuracy. • To determine the volume of reservoirs, reservoir Yield and simple hydraulic components.

Teaching and Learning Strategies

Strategy

1- Explaining and clarifying the basics in safety, operation of dams and topics related to educational outcomes through delivery, lecture, and discussion.
2- Solving a group of applied examples by the subject teacher, with students participating by solving some examples and applied questions.
3- Continuous daily and weekly surprise tests and directing the student to prepare reports on safety and operation of dams to expand his understanding of the subject.
4- Directing students to some websites to benefit from them.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
	4	General Introduction	Introduction to Overflow Spillway: Ogee Spillway, Design of Ogee Spillway,	Theoretical	Discussion, quick exam, problem solving, homework
	4		Tutorial	Theoretical	Discussion, quick exam, problem solving, homework
	4	Types of spillway	Side-Channel Spillway, Design Criteria. Flow Profile Analysis for Side-Channel Spillway: Chute Spillway: General Specification: Chute Sidewalls	Theoretical	Discussion, quick exam, problem solving, homework
	4		Tutorial	Theoretical	Discussion, quick exam, problem solving, homework
	4	Types of spillway	Shaft Spillway, Siphon Spillway: Siphon Behavior.	Theoretical	Discussion, quick exam, problem solving, homework
	4		Tutorial	Theoretical	Discussion, quick exam, problem solving, homework
	4		Mid-term Exam1	Theoretical	Discussion, quick exam, problem solving, homework
	4	Outlet work operation	Outlet Work: Functions of outlet works: Sluiceways: Hydraulics of Outlet Works:	Theoretical	Discussion, quick exam, problem solving, homework

	4	Energy Dissipation Operation	Energy Dissipation below Spillways: Characteristics of a Hydraulic Jump: Hydraulic Jump as an Energy Dissipater: Length of Hydraulic Jump:	Theoretical	Discussion, quick exam, problem solving, homework
	4	Hydraulic jump as Energy Dissipation	Jump High Curve (JHC): Tail water rating curve: Location of a Hydraulic Jump:	Theoretical	Discussion, quick exam, problem solving, homework
	4	Types of Stilling Basin:	Stilling Basins: Types of Stilling Basin:	Theoretical	Discussion, quick exam, problem solving, homework
	4		Tutorial	Theoretical	Discussion, quick exam, problem solving, homework
	4	Types of Reservoirs	Dams Operation: Reservoirs: Types of Reservoirs: Zones of Storage: Reservoir Yield:	Theoretical	Discussion, quick exam, problem solving, homework
	4	Reservoir Operation	Reservoir Mass Curve and Storage: Tutorial	Theoretical	Discussion, quick exam, problem solving, homework
	4		General Review	Theoretical	Discussion, quick exam, problem solving, homework
	4	2nd Course Exam			

Course Evaluation
The evaluation is done on the basis of: 1- Monthly exams: 20% 2- Daily exams: 10% 3- Duties: 5% 4- Commitment to working hours + daily participation: 5% 6- Final exam: 60%

Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources) : Fundamentals of Hydraulic Engineering Systems Ven Te Chow, Applied hydrology	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name: Engineering Optimization
Course Code: DWE4307
Semester / Year: Semester I/Fourth academic year
Description Preparation Date: 25/12/2024
Available Attendance Forms: Official working hours
Number of Credit Hours (Total) / Number of Units (Total): 60/3
Course administrator's name (mention all, if more than one name)
Name: Mohammed Falah Allawi Email: mohammed.falah@uoanbar.edu.iq
Course Objectives

Course Objectives	• **science of optimization Because The student understands t he one Scientific and applied foundations For dam and wat resources engineering.** • **It has an important role in increasing the student's -B intellectual awareness ofdealing with engineering problem and achieving solutions for this problems.** **Its basic and prominent role in the design of buildings and facilities is related to irrigation and damengineering.**
Teaching and Learning Strategies	
Strategy	5- educational Providing students with the basics and topics related to previous or ،lecture ،outcomes and the skills to solve practical problems through speech .presentations 6- .Solving a group of practical and applied examples by the subject teacher 7- .students participate in solving some practical problems ،Through discussion. 8- .Daily surprise and continuous weekly tests Directing students to some websites to benefit from them.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
First	3	Cognitive objectives	Introduction	theoretical	Discussion, quick exam, problem solving, homework
Second	3	Cognitive objectives	Modeling with Linear Programming	theoretical	Discussion, quick exam, problem solving, homework

Third	3	Course-specific skills objectives	Tutorials	theoretical	Discussion, quick exam, problem solving, homework
Fourth	3	Cognitive objectives	Graphical method	theoretical	Discussion, quick exam, problem solving, homework
Fifth	3	Course-specific skills objectives	Tutorials	theoretical	Discussion, quick exam, problem solving, homework
Sixth	3	Cognitive objectives	The Simplex Method	theoretical	Discussion, quick exam, problem solving, homework
Seventh	3	Cognitive objectives	Two-phase method	theoretical	Discussion, quick exam, problem solving, homework
VIII	3	Course-specific skills objectives	Tutorials	theoretical	Discussion, quick exam, problem solving, homework
Ninth	3	Cognitive objectives	The Dual Simplex Method	theoretical	Discussion, quick exam, problem solving, homework
The tenth	3	Course-specific skills objectives	Tutorials	theoretical	Discussion, quick exam, problem solving, homework
eleventh	3	Course-specific skills objectives	Quiz	theoretical	Discussion, quick exam, problem solving, homework
twelveth	3	Course-specific skills objectives	Tutorials	theoretical	Discussion, quick exam, problem solving, homework
Thirteenth	3	Cognitive objectives	Big-M method	theoretical	discussion, quick exam , Problem solving, homework
fourteenth	3	Cognitive objectives	Duality and Sensitivity Analysis	theoretical	discussion, quick exam , Problem solving, homework
Fifteenth	3	Cognitive objectives	THE REVISED SIMPLEX METHOD	theoretical	discussion, quick exam , Problem solving, homework
sixteen	3	Review			

Course Evaluation

The evaluation is done on the basis of:

1- Monthly exams: 20%

2- Daily exams: 10%

3- Duties: 5%

4- Commitment to working hours + daily participation: 5%

6- Final exam: 60%

Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources) : *Loucks DP and Beek EV (2005) Water Resources Systems Planning and Management. UNESCO*	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name: Hydraulic structures	
Course Code: DWE3306	
Semester / Year: Semester I/Third academic year	
Description Preparation Date: 25/12/2024	
Available Attendance Forms: Official working hours	
Number of Credit Hours (Total) / Number of Units (Total): 45/3	
Course administrator's name (mention all, if more than one name)	
Name: Mohammed Falah Allawi Email: mohammed.falah@uoanbar.edu.iq	
Course Objectives	
Course Objectives	• **Identification requester the most important hydraulic structures and their design methods Because he one Basic topics Scientific For dam and water resources engineering.** • **B-It has an important role in Increasing the stude intellectual awareness to deal with problems the Engineering facing hydraulic structu and find Solutions For these problems.** • **Turn Basic And prominent in Preparation Designs and pl Its facilities relationship With engineering Irrigation and dams.**
Teaching and Learning Strategies	
Strategy	9- Using modern means to present the scientific and theoretical aspects, such as devices Data Show to attract attention and attract students so that the idea reaches the student better. 10- Giving students extra-curricular assignments that require them to exert skills and self-explanations in experimental ways. 11- Interrogating students through discussion sessions by asking intellectual questions such as: (how, why, when,

	where, which) for specific topics. 12- Using the method of brainstorming and mental nutrition in order to activate the accumulated experiences of students by linking the subjects taken in the pre-university educational levels and linking them to the new ones. 13- Providing students with practical skills by linking their studies to practical reality.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
the first	**3**	General definition of the topic	Introduction	theoretical	Discussion, quick quiz, Solve problems, Homework
the second	**3**	Design considerations	Principles of Hydraulic Systems Analysis	theoretical	Discussion, quick quiz, Solve problems, Homework
the third	**3**	Classification of types of establishments	Classification of Structures for Flow Control	theoretical	Discussion, quick quiz, Solve problems, Homework
the fourth	**3**	Height pressure calculation and designFlooring	Design of floors by bligh theory	theoretical	Discussion, quick quiz, Solve problems, Homework
Fifth	**3**	Height pressure calculation and designFlooring	Design of floors by line,s theory	theoretical	Discussion, quick quiz, Solve problems, Homework
VI	**3**	Introduction to hydraulic facilities regulating flow	Introduction of Channel Regulating Structures (weirs, barrages, sluice gates, etc.)	theoretical	Discussion, quick quiz, Solve problems, Homework
Seventh	**3**	Exam and review	Quiz with solve problems and discussion	theoretical	Discussion, quick quiz, Solve problems, Homework

VIII	**3**	Waste design	weirs	theoretical	Discussion, quick quiz, Solve problems, Homework
Ninth	**3**	Practical examples of dam design	weirs(Tutorial (examples)	theoretical	Discussion, quick quiz, Solve problems, Homework
The tenth	**3**	Gate design	Design of sluice gates	theoretical	Discussion, quick quiz, Solve problems, Homework
eleventh	**3**	Introduction to the types of dams and the function of each	Channel Intake and Outlet (Diversion) Structures	theoretical	Discussion, quick quiz, Solve problems, Homework
twelveth	**3**		Flow Measurement Structures	theoretical	Discussion, quick quiz, Problem solving, homework
Thirteenth	**3**	Design considerations for dam components	Dam Spillways and Outlet Works	theoretical	Discussion, quick quiz, Problem solving, homework
fourteenth	3	Studying the types of energy dissipators	Energy Dissipation Structures Design of sitting basin	theoretical	Discussion, quick quiz, Problem solving, homework
Fifteenth	3	Study of ferries and their hydraulic and structural design	Culverts	theoretical	Discussion, quick quiz, Problem solving, homework
sixteen	3	2nd Course Exam			

Course Evaluation

The evaluation is done on the basis of:

1- Monthly exams: 20%
2- Daily exams: 10%
3- Duties: 5%
4- Commitment to working hours + daily participation: 5%
5- Lab : 10%
6- Final exam: 50%

Learning and Teaching Resources

Required textbooks (curricular books, if any)	

Main references (sources) : Open channel hydraulics,ven.te chow	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name: **Open Channels**
Course Code: **DWR006**
Semester / Year: First Semester / Second Academic Year
Description Preparation Date: 25-12-2024
Available Attendance Forms: Official working hours
Number of Credit Hours (Total) / Number of Units (Total) : 6/5
Course administrator's name (mention all, if more than one name)
Name: Assist prof. uday hatem Email: uday_hatem@uoanbar.edu.iq
Course Objectives
Course Objectives A - Introducing the student to the most important types of open channels and methods of designing them because it is one of the basic scientific topics of dam engineering and water resources. B - It has an important role in increasing the student's intellectual perceptions to deal with the engineering problems facing hydraulic installations and find solutions to these problems. C- Its basic and prominent role in preparing designs and plans for open channels related to irrigation engineering and dams.
Teaching and Learning Strategies
Strategy 1 - Providing students with the basics and topics related to the previous learning outcomes of skills to solve practical problems through speech, lecture or experiments. 2- Solving a set of practical and applied examples by the subject teacher. 3- Through discussion, students are involved by solving some practical problems. 4- Sudden daily and weekly continuous tests. 5- Guiding students to some websites to benefit from them.
Course Structure

The week	Hours	Required Learning Outcomes	Name of the unit/course or topic	Method of education	Evaluation method
1	4	General definition of the subject	Introduction,	theoretical	Discussion, Quick Exam, Problem Solving, Homework

2	4	Types of flow and ducts		theoretical	Discussion, Quick Exam, Problem Solving, Homework
3	4	Special equations for calculating areas	Types, state, and regims of flow, Kindes of open channel	theoretical	Discussion, Quick Exam, Problem Solving, Homework
4	4	Optimal section theory		Practical	Discussion, Quick Exam, Problem Solving, Homework
5	4	Speed distribution of flow section	Channel geometry (rectangular), Channel geometry (others)	theoretical	Discussion, Quick Exam, Problem Solving, Homework
6	4	Pressure distribution of flow section		theoretical	Discussion, Quick Exam, Problem Solving, Homework
7	4	Energy & Specific Energy	Best efficient section	theoretical	Discussion, Quick Exam, Problem Solving, Homework
8	4	Channel Design		theoretical	Discussion, Quick Exam, Problem Solving, Homework
9	4	Practical examples of critical flow design	Quiz with resolve problems and discussion	theoretical	Discussion, Quick Exam, Problem Solving, Homework
10	4	Definition of uniform flow	Velocity-distribution coefficients	theoretical	Discussion, Quick Exam, Problem Solving, Homework
11	4	Design for lined duct types	Design of Erodible channels	Practical	Discussion, Quick Exam, Problem Solving, Homework

12	4	Design for corrosive channel types	- Design of nonerodible channels	theoretical	Discussion, Quick Exam, Problem Solving, Homework
13	4	Calculating the design dimensions of flow sections	- Determination of section dimentions	theoretical	Discussion, Quick Exam, Problem Solving, Homework
14	4	define and use the Lycee equation for channel design	- Lacy equation	Practical	Discussion, Quick Exam, Problem Solving, Homework
15	4	Examples and review	- Quiz + resolve questions	theoretical	Discussion, Quick Exam, Problem Solving, Homework
16	3	Final exam	Final exam		

Course Evaluation: Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%).	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Fluid Mechanics, Streeter
Main references (sources)	Fluid Mechanics, Streeter
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name:
Building construction
Course Code:
DWR 001
Semester / Year:
I/ First stage
Description Preparation Date:
25/12/2024
Available Attendance Forms:
Classroom presence
Number of Credit Hours (Total) / Number of Units (Total)
2
Course administrator's name (mention all, if more than one name)
Name: Aseel Madallah Mohammed

Email: aseel.mohammed@uoanbar.edu.iq	
Course Objectives	
Course Objective	1. The student understands the science of building construction because it is the basis and entry point for dealing with engineering facilities 2-Increasing students' understanding and awareness of how to deal with hydraulic buildings and how to increase their lifespan through the use of appropriate construction materials for use on the work site, in addition to how to protect these facilities from external conditions and methods of constructing them
Teaching and Learning Strategies	
Strategy	.1.Lecture and Presentation 2 .Daily surprise and weekly tests 3. Individual homework and reports

Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
First	2	introduction	A general introduction to building construction and methods of completion	Theoretical	Homework
Second	2	Construction materials	Building materials and their compliance with standard specifications		Quick Exam
Third	2	Equipment used in the creation of buildings	Mechanical equipment used in building construction		Quick Exam
Fourth	2	Earth works	Excavations, soil fillings, and various supporting methods		Homework
V	2	Groundwater draina	How to drain groundwater from a work site		Quick Exam
Sixth	2	Foundations	Types of foundations used in buildings.		Homework + Quick Exam
Seventh	2	Dams Mid Exam	Types and design of dams		
Eighth	2	Culverts	Applications and types of Culverts		Discussion + Questions + Homework

Ninth	2	Regulators	Design and types.		Homework + Quick Exam
X	2	Bridges	Applications and types of Bridges		Discussion + Questions + Homework
Eleventh	2	Lining of canals	Application and types.		Discussion + Questions + Homework
Twelfth	2	Cast of concrete under water	Methods of casting		Homework + Quick Exam
Thirteenth	2	Hydraulic structures	Applications of and types of hydraulic structures.		Exam
Fourteenth	2	River banks	Types and benefit of river banks lining		Homework
Fifteenth	-	Final Exam and Assessment	Final Exam		-

Course Evaluation	
The evaluation is based on 17. Monthly exams 20% 18. Daily 10% 19. Duties 5% 20. Daily participation in class 5% 21. Mid Exam 10% Final Exam 50%	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Building construction , Zuhir Sako Web nets
Main references (sources)	None
Recommended books and references (scientific journals, reports...)	None
Electronic References, Websites	None

Course Description Form

Course Name: Theory of Structures
Course Code: DWE3321

Semester / Year: Autumn, 2024/2025

Description Preparation Date: 25/12/2025

Available Attendance Forms: Class

Number of Credit Hours (Total) / Number of Units (Total): 3/3

Course administrator's name (mention all, if more than one name)

Name: Dr. Zaid M. Kani
Email: zaid.kani@uoanbar.edu.iq

Course Objectives

Course Objectives	1. To understand analysis of indeterminate structures and adopt an appropriate structural analysis technique. 2. Determine response of structures by classical, iterative and matrix methods

Teaching and Learning Strategies

Strategy	1- Provide students with the basics and subjects related to pre-skilled education outcomes to solve practical problems through giving, lecture or experimentation. 2. Solving a set of practical and applied examples by the teacher of the subject. 3. Through discussion, students' participation is done by solving some practical problems. 4. Continuous daily sudden and weekly tests. Guide students to certain websites to benefit from them.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	**1**	Introduction to structural analysis	Theory	**Discussion, quick exam, problem solving, homework**
2	3	**1**	Determinacy and stability of structures	Theory	**Discussion, quick exam, problem solving, homework**
3	3	**1**	Shear and moment diagrams of structures	Theory	**Discussion, quick exam, problem**

					solving, homework
4	3	**1**	Shear and moment diagrams of structures	Theory	**Discussion, quick exam, problem solving, homework**
5	3	**1**	Simple Trusses and Compound Trusses	Theory	**Discussion, quick exam, problem solving, homework**
6	3	1	Complex Trusses OR Approximate Analysis of Structures	Theory	**Discussion, quick exam, problem solving, homework**
7	3	1و2	Influence lines and moving concentrated loads	Theory	**Discussion, quick exam, problem solving, homework**
8	3	1و2	Influence lines and moving concentrated loads	Theory	**Discussion, quick exam, problem solving, homework**
9	3	1و2	Deflection of determinate structures	Theory	**Discussion, quick exam, problem solving, homework**
10	3	1و2	Deflection of determinate structures	Theory	**Discussion, quick exam, problem solving, homework**
11	3	1و2	Analysis of indeterminate structures- Consistent deformation method.	Theory	**Discussion, quick exam, problem solving, homework**
12	3	1و2	Analysis of indeterminate structures- Consistent deformation method.	Theory	**Discussion, quick exam, problem solving, homework**
13	3	1و2	Analysis of indeterminate structures using Slope-Deflection	Theory	**Discussion, quick exam, problem solving,**

			Method		**homework**
14	3	1و2	Analysis of indeterminate structures using Slope-Deflection Method	Theory	**Discussion, quick exam, problem solving, homework**
15	3	1و2	Analysis of indeterminate structures using Moment-Distribution Method	Theory	**Discussion, quick exam, problem solving, homework**
16	There is no week 16 according to the academic calendar				

Course Evaluation
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc 1- Monthly exams: 20% 2- Daily exams: 10% 3- Homework: 5% 4- Commitment to working hours + daily participation: 5% 5- Final exam: 60%

Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Theory of Structures by Hibbler, 8th edition
Main references (sources)	- Theory of Structures by S.P. Timoshenko and D. H. Young - 2nd edition. - Theory of Structures by Yuang Yu Hsiegh. - Structural Analysis by Aslam Kassimali, 4th edition. - Structural and Stress Analysis by Dr. T.H.G Megson – 2nd edition, 2000.
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

Course Name: Water resources management and planning
Course Code: DWE4307
Semester / Year: Semester II/Fourth academic year

Description Preparation Date: 25/12/2024

Available Attendance Forms: Official working hours

Number of Credit Hours (Total) / Number of Units (Total): 60/3

Course administrator's name (mention all, if more than one name)

Name: Mohammed Falah Allawi
Email: mohammed.falah@uoanbar.edu.iq

Course Objectives

Course Objectives

This course will provide the student with an introduction to the planning, design, and operation of wa resource systems using mathematical optimization methods and models. The student will learn how apply basic economic analysis (engineering economic analysis, microeconomics) and operations resea techniques (linear, nonlinear, dynamic programming, combinatorial optimization) and apply them various surface and groundwater resource allocation problems.

Teaching and Learning Strategies

Strategy

1- Explain and clarify the basics in Water resources engineering management and planning In particular, topics related to educational outcomes through delivery, lecture and discussion.
2- Solving a group of applied examples by the subject teacher. Students participate by solving some examples and applied questions.
3- Continuous daily and weekly surprise tests and directing the student to prepare reports on construction management vocabulary and the sequence of logical work paragraphs to expand his understanding of the subject.
4- Directing students to some websites to benefit from them.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
the first	4		Introduction: Water Resources Planning and Management, EWRE Program Objectives Water Availability and Use Global Water Resources, Typical domestic water use Water Stress Index, Water Stress, Water Crisis.	theoretical	discussion , Solve problems, Homework
the second	4		Sustainable Development Sustainability, Principle to Practice Multidisciplinary Adaptive Process Sustainability Criteria	theoretical	Discussion, quick quiz, Solve problems

the third	4		Water Resource Systems Analysis, System Transformation Function, Simulation. Simulation vs Optimization, Modeling Process.	theoretical	discussion,Homework
the fourth	4		Water Resources Development, Benefit – Cost Analysis, Direct costs, Cash Flow Diagrams Discount Rate, Incremental DB/DC Method.	theoretical	Discussion, quick quiz
Fifth	4		Microeconomics, Consumers, Consumer's Budget Demand, Value, Willingness-to-Pay, Measuring Benefits w/Market Methods using Market Prices Circumstantial Evidence, Imputed WTP Methods using Circumstantial, Evidence summarizing – Measuring, Benefits w/o Market, Why estimate ecosystem values. Measures of Ecosystem Values Challenges of Ecosystem Valuation.	theoretical	discussion, Solve problems
Sixth	4		Firms, Profit, The Firm's Problem Revenue, The Firm's Problem – 2nd Way, Cost Functions, and Competitive Firm.	theoretical	discussion
Seventh	4		Consumers' WTP , Producers' Cost Pricing , Consumers' & Producers' Surpluses , Surpluses – What they mean Production Functions Stages of Production	theoretical	
Eighth	4		Optimization of Water Resources Introduction: Linear Programming, Nonlinear Programming, Dynamic Programming	theoretical	discussionSolve problems, Homework
Ninth	4		Linear Programming, Graphical Method, Bounded area,	theoretical	Discussion, quick quiz, Solve problems

			Unbounded, Feasible area, Line feasible solution, Water Resources application by Graphical solution..		
The tenth	4		Classical Optimization methods Linear Programming formulation. feasible solution, optimal, Terminology, Decision variables, Constraints, Objective Function	theoretical	discussionHomework
eleventh	4		Stream waste load allocation models Linear superposition Linear programming (LP) formulation, Groundwater quality management Optimal steady state pump & treatment design Linear superposition LP formulation, Single reservoirs Multiple reservoirs in series Linear programming (LP) formulation	theoretical	Discussion, secret examA
twelfth	4		Classical Optimization methods Linear Programming the simplex method, one phase, two phase. Water resources, Surface water, Application.	theoretical	Discussion, quick quiz
Thirteenth	4		Optimization methods Linear Programming on Revised simplex method Water resources, Surface water, Application	theoretical	discussion, Solve problems
fourteenth	4		Optimization methods Linear Programming on Sensitivity Revised simplex method Water resources, Surface water, Application	theoretical	discussion ,
Fifteenth	4		Optimization methods Linear Programming on transportation method (Balanced Transportation Problem)Water resources	theoretical	discussion, Solve problems

sixteen	3	2nd Course Exam			

Course Evaluation
The evaluation is done on the basis of: 1- Monthly exams: 20% 2- Daily exams: 10% 3- Duties: 5% 4- Commitment to working hours + daily participation: 5% 6- Final exam: 60%
Learning and Teaching Resources

Required textbooks (curricular books, if any)	
Main references (sources) : Loucks, Daniel P. and Eelco van Beek, Water Resources Systems Planning and Management: An Introduction to Methods, Models and Applications.	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name:
Soil Mechanics
Course Code:
DWE3319
Semester / Year:
Second semester/ 2023-2024
Description Preparation Date:
25/12/2024
Available Attendance Forms:
In class – Weekly
Number of Credit Hours (Total) / Number of Units (Total)
4/3
Course administrator's name (mention all, if more than one name)
Name: Nabeel S. Mahmood, PhD Email: nabeelshm@uoanbar.edu.iq
Course Objectives

Course Objectives	1- Understand the basic soil index and physical properties 2- Understand relationships of the fluid flow through the soil 3- Understand the basics of stress-stain properties of the soil 4- Understand the shear strength relationships
Teaching and Learning Strategies	
Strategy	1. Lecture-based learning 2. Problem Based Learning (PBL) 3. Directed Discussion

Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject**	**Learning method**	**Evaluation method**

			name		
1	4	1- Understand the basic soil index and physical properties	Introduction to Soil Mechanics	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
2	4	1- Understand the basic soil index and physical properties	Introduction to Soil Mechanics	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
3	4	2- Understand relationships of the fluid flow through the soil	Permeability and seepage	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
4	4	2- Understand relationships of the fluid flow through the soil	Permeability and seepage	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
5	4	2- Understand relationships of the fluid flow through the soil	Permeability and seepage	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
6	4	3- Understand the basics of stress-stain properties of the soil	Stresses within soil mass	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
7	4	3- Understand the basics of stress-stain properties of the soil	Stresses within soil mass	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
8	4	3- Understand the basics of stress-stain properties of the soil	Compressibility	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
9	4	3- Understand the basics of stress-stain properties of	Compressibility	Lecture-based learning	Discussion, quick

		the soil		Problem Based Learning (PBL) Directed Discussion	exam, problem solving, homework
10	4	4- Understand the shear strength relationships	Shear strength	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
11	4	4- Understand the shear strength relationships	Shear strength	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
12	4	4- Understand the shear strength relationships	Shear strength	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
13	4	4- Understand the shear strength relationships	Shear strength	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
14	4	4- Understand the shear strength relationships	Shear strength	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
15	4	4- Understand the shear strength relationships	Shear strength	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
16		**First Course Exam**			

Course Evaluation	
1- Monthly exams: 20% 2- Daily exams: 10% 3- Lab: 10% 4- Commitment to working hours + daily participation: 10% 5- Final exam: 50%	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Fundamental of geotechnical Engineering, Braja Das McGraw-Hill, 9th edition 2018.

Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name: Design of Dams	
Course Code: DWR020	
Semester / Year: 1/2024	
Description Preparation Date: 25/12/2024	
Available Attendance Forms: in-person	
Number of Credit Hours (Total) / Number of Units (Total) 150/6	
Course administrator's name (mention all, if more than one name)	
Name: Dr. Ammar H. Kamel & Dr. Rafid S.Rashid Email: *rafid.alboresha@uoanbar.edu.iq*	
Course Objectives	
Course Objectives	1. To impart the principles of analysis, design, and behavior of dam and hydraulic structures belong to it. 2. To enable the student how to choose the suitable type of dams and how to select the perfect site to construct the dam. 3. Familiarity with professional and contemporary issues.
Teaching and Learning Strategies	
Strategy	Combining theoretical understanding with real-world applications, like case studies completed dams and simulations, is one way to learn in a dam design course. Empha should also be placed on problem-solving, and understanding environmental, structu and hydrological considerations

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	1,2	Introduction: Important Ter for The main Pa of Dam, Plann Consideration, Classification Dams and Fact Governing Selection Site Dams.-		homewo

2		2	Flood Hydrol for Des Purposes		Quiz, homew
3		2,6	Estimation design flood		homew
4		2	Gravity Dams -		homew
5			Gravity Dams		quiz
6			Exam1		
7			Concrete A Dams - I		homew
8			Concrete A Dams - II		quiz
9			Buttress Dams		homew
1			Exam 2		
1			Earth Dams - I		homew
1			Earth Dams – I		quiz
1			Rock fill		homew
			Exam3		
1			Preparatory w before the fi Exam		
1					

Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	Hydraulic Structures, P. Novak, A.I.B. Moffat and C. Nalluri School of Civil Engineering & Geosciences, University of Newcastle upon Tyne, UK And R. Narayanan
Recommended books and references (scientific journals, reports...)	Formerly Department of Civil and Structural Engineering, UMIST, University of Manchester, UK Fourth edition published 2007 by Taylor & Francis
Electronic References, Websites	

Course Description Form

Course Name: Engineering Geology
Course Code: DWR002

Semester / Year:2/2024-2025

Description Preparation Date:25/12/2024

Available Attendance Forms: in-person

Number of Credit Hours (Total) / Number of Units (Total) 125/5

Course administrator's name (mention all, if more than one name)

Name: Rafid S. Rashid
Email: rafid.alboresha@uoanbar.edu.iq

Course Objectives

Course Objectives	1. To study and identify different types natural materials like rocks & minerals. 2. To know the physical properties of rocks & minerals. 3. Have knowledge about geohazards, earthquakes, and tunneling. 4. To know the importance of geological maps.

Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this module is to encour students' participation in the exercises, while at the same time refining and expand their critical thinking skills. This will be achieved through classes, interactive tutor and by considering types of simple experiments involving some sampling activities t are interesting to the students.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3		Introduction Definition, purpose and scope The Earth and Systems -		homewo
2	3		**Minerals** Types classifications minerals		quiz
3	3		**Rocks** Types and cycle of rock formation -geological fo faults and joint		quiz
4	3		Engineering physical properties		homewo

			rocks		
5	3		First Exam		
6	3		**Engineering Maps** (Topographic Geological Ma		homewo
7	3		**Geohazards** -ground movements -ground failure		quiz
8	3		-slope unstability -seisms		homewo
9	3		Second Exam		
10	3		**Introduction to Geology of Tunnels & Dams** <u>I- tunnels</u> -types of tunnels. - Methods of tunnel. -tunnel (openi in massive ro two-dimensiona case.		quiz
11	3		-stress distribution around circular opening. - required stud for tunn construction (effect of lay floods and fault		homewo
12	3		<u>II- dams</u> -dams importance. -dam types. -required studies for dams' construction. -forces affect dams.		quiz
13	3		required studies for dams' construction. -forces affect dams.		homewo
	3		Third Exam		
14	3		Preparatory w before the fi Exam		
15					
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc					

11. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	Terry R. West, Geology Applied Engineering, Waveland Press, 1995
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name: Computer Science	
Course Code: DWE1209	
Semester / Year: 2nd semester/ 2024-2025	
Description Preparation Date: 26/12/2024	
Available Attendance Forms: Official working hours	
Number of Credit Hours (Total) / Number of Units (Total): 2 /45	
Course administrator's name (mention all, if more than one name)	
Name: Ibtihal A. Mawlood & Aseel Abdaljader Email: ibtihal.maoloud@uoanbar.edu.iq	
Course Objectives	
Course Objectives	• To develop proficiency in using Microsoft Office applications. • To understand the integration of Microsoft Office tools in computer science tasks. • To enhance productivity and efficiency through the effective use of Office applications. • To apply Microsoft Office skills to real-world scenarios and projects.
Teaching and Learning Strategies	
Strategy	• Demonstrate proficiency in using Microsoft Word to create, format, and manage professional documents. • Utilize Microsoft Excel to perform data analysis, create spreadsheets, and use advanced functions and formulas. • Develop and design effective presentations using Microsoft PowerPoint, incorporating multimedia elements and animations. • Create and manage databases using Microsoft Access, including designing forms, reports, and running queries. • Integrate and automate tasks across Microsoft Office applications using macros and VBA (Visual Basic for Applications). • Apply Microsoft Office skills to real-world scenarios and projects, enhancing productivity and efficiency
Course structure:	

Evaluation method	Teaching method	outcomes Name of unit/course or subject	Required learning	Hours	Week
Discussion, quick exam, problem solving, homework	Theoretical	Computer Fundamentals and safety	General definition of the topic	3	Thirty-s
Discussion, quick exam, problem solving, homework	Theoretical	Computer Components	Knowledge and understanding	3	Thirty-e
Discussion, quick exam, problem solving, homework	Theoretical	Operation system	Design considerations	3	Thirty-n
Discussion, quick exam, problem solving, homework	Theoretical	Introduction to MS-Word	Knowledge and understanding	3	Fortieth.
Discussion, quick exam, problem solving, homework	Theoretical	Insert objects in MS-Word	Design considerations	3	Forty-fi
Discussion, quick exam, problem solving, homework	Theoretical	Insert objects in MS-Word	Knowledge and understanding	3	Forty-se
Discussion, quick exam, problem solving, homework	Theoretical	Exam and discuss the results	Exam and review	3	Forty-th
Discussion, quick exam, problem solving, homework	Theoretical	Additional tasks in MS-Word	Scoop, understand and design	3	Forty-fo
Discussion, quick exam, problem solving, homework	Theoretical	Additional tasks in MS-Word	Design considerations	3	Forty-fif
Discussion, quick exam, problem solving, homework	Theoretical	introduction to MS-Power Point	Design considerations	3	Forty-si
Discussion, quick exam, problem solving, homework	Theoretical	introduction to MS-Power Point	Knowledge and understanding	3	Forty-se
Discussion, quick exam, problem solving, homework	Theoretical	Exam and discuss the results	Exam and review	3	Forty-ei
Discussion, quick exam, problem solving, homework	Theoretical	Introduction to MS-Excel	Knowledge and understanding	3	Forty-ni

Discussion, quick exam, problem solving, homework	Theoretical	Introduction to MS-Excel	Design and cognitive considerations	3	Fiftieth.
Discussion, quick exam, problem solving, homework	Theoretical	Exam and discuss the results	General examination and review	3	Fifty-firs
2nd Course Exam				**3**	**Fifty-secon**

Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc
1Monthly exams: 20%
2 -Daily exams: 10%
3 -Duties: 5%
4 -Commitment to working hours + daily participation: 5%
5 -Midterm 10%
5- Final exam: 50%

Learning and Teaching Resources

Required textbooks (curricular books, if any)	•"Microsoft Office 2019 Step by Step" by Joan Lambert Curtis Frye
Main references (sources)	
Recommended books and references (scientific journals, reports…)	
Electronic References, Websites	

Course Description Form

Course Name: Sanitary Engineering
Course Code: DWE3323
Semester / Year: Fall /2024-2025
Description Preparation Date: 25/12/2024
Available Attendance Forms: Theoretical
Number of Credit Hours (Total) / Number of Units (Total) 3/45
Course administrator's name (mention all, if more than one name)
Name: Arkan Dhari Jalal and Yasir Abdulmajeeed Muhammad Email: aniyaser@uoanbar.edu.iq, arkan.dhari@uoanbar.edu.iq
Course Objectives

Course Objectives	1. To know the basics, importance, and methods of water supply. 2. To study the various sources and properties of water.

	3. To understand the various methods of conveyance of water. 4. To learn the objectives and methods of water treatment and to study the features and function of different water treatment units.
Teaching and Learning Strategies	
Strategy	This course introduces fundamental concepts in the field of water supply engineering and sanitary engineering. The student will learn about water supply, drinking water , drinking water requirements , water quality, water treatment process. Then go into design of water treatment plant and water network design .

Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	3	Apply math an science principl in the design an analysis process	Introduction, WATE SUPPLY ENGINEERING	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendance Monthly exams Oral exam final exam
2	3	Apply math an science principl in the design an analysis process	Water Quantity Estimation	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
3	3	Apply math an science principl in the design an analysis process	Population Forecast Method	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
4	3	Apply math an science principl in the design an analysis process	Water Pollution and Pollutant Types	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
5	3	Apply math an science principl in the design an analysis process	Drinking Water Characteristics	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo	Short exams Homework Activity + attendar Monthly exams Oral exam final exam

				in an interact manner	
6	3	Apply math an science principl in the design an analysis process	Drinking water treatment Plant Unit	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attenda Monthly exams Oral exam final exam
7	3	Apply math an science principl in the design an analysis process	Water Intake and Screen Units Design	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attenda Monthly exams Oral exam final exam
8	3	Apply math an science principl in the design an analysis process	Pumps and Pumping Stations Installation	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attenda Monthly exams Oral exam final exam
9	3	Apply math an science principl in the design an analysis process	Conventional Water Treatment (Coagulat Unit Design)	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attenda Monthly exams Oral exam final exam
10	3	Apply math an science principl in the design an analysis process	Conventional Water Treatment (Flocculation Unit Design)	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attenda Monthly exams Oral exam final exam
11	3	Apply math an science principl in the design an analysis process	Conventional Water Treatment (Sedimentation Unit Design), Quiz	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attenda Monthly exams Oral exam final exam
12	3	Apply math an	Conventional Water	Theoretical	Short exams

		science principl in the design an analysis process	Treatment (Sedimentation Unit Design),	applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Homework Activity + attendar Monthly exams Oral exam final exam
13	3	Apply math an science principl in the design an analysis process	Conventional Water Treatment (Filtration Unit) and Back Wash Process	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
14	3	Apply math an science principl in the design an analysis process	Conventional Water Treatment (Filtration Unit) and Back Wash Process	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
15	3	Apply math an science principl in the design an analysis process	Chlorination system Units Design	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
16	3	Apply math an science principl in the design an analysis process	Final Exam		

Course Evaluation	
Midterm exam#1(15%)+MidTErmexam#2(15%)+HW(5%)+Quiz(5%)+ Final exam(60%)	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	WATER SUPPLY AND SEWERAGE E.W.STEEL & TERENCE J .MCGHEE FIFTH Edition
Main references (sources)	
Recommended books and references (scientific journals, reports...)	Chang R. & College W.,Chemistry, McGraw Hill 9th ed., 2007
Electronic References, Websites	

Course Description Form

Course Name: **Fluid Mechanics**

Course Code: **DWR003**
Semester / Year: First Semester / Second Academic Year
Description Preparation Date: 25-12-2024
Available Attendance Forms: Official working hours
Number of Credit Hours (Total) / Number of Units (Total) : 6/5
Course administrator's name (mention all, if more than one name)
Name: Assist prof. uday hatem Email: uday_hatem@uoanbar.edu.iq
Course Objectives

Course Objectives	The goals of this course are to enable students to: 1. Understand the practical concepts of fluid behavior and their interaction with fluid and structures. **2.** Apply the knowledge of fluid properties and basic mechanics to analyze and design hydraulic structures that are related to Dams and Water Resources Engineering program.
Teaching and Learning Strategies	
Strategy	1 - Providing students with the basics and topics related to the previous learning outcomes of skills to solve practical problems through speech, lecture or experiments. 2- Solving a set of practical and applied examples by the subject teacher. 3- Through discussion, students are involved by solving some practical problems. 4- Sudden daily and weekly continuous tests. 5- Guiding students to some websites to benefit from them.

Course Structure

The week	Hours	Required Learning Outcomes	Name of the unit/course or topic	Method of education	Evaluation method
1	4	General definition of the subject	Introduction, Properties of fluids	theoretical	Discussion, Quick Exam, Problem Solving, Homework
2	4	Liquids in equilibrium, pressure	Fluid in static pressure	theoretical	Discussion, Quick Exam, Problem Solving, Homework
3	4	Calculating forces on submerged surfaces of all kinds	forces on submerged surfaces	theoretical	Discussion, Quick Exam, Problem Solving, Homework
4	4	Introduction to calculating	Lab 1 Fluid	Practical	Discussion,

		energy for flow and defining Bernoulli's equation	Properties Lab 2 Fluid Statics		Quick Exam, Problem Solving, Homework
5	4	Calculating the force due to acceleration	Mass acceleration	theoretical	Discussion, Quick Exam, Problem Solving, Homework
6	4	Types of flow	Liquid motion	theoretical	Discussion, Quick Exam, Problem Solving, Homework
7	4	Definition of Euler's Energy Equation	Basic equation	theoretical	Discussion, Quick Exam, Problem Solving, Homework
8	4	Application of Continuity equation	Continuity equation	theoretical	Discussion, Quick Exam, Problem Solving, Homework
9	4	Application of energy equation	Energy equation	theoretical	Discussion, Quick Exam, Problem Solving, Homework
10	4	Application of momentum equation	Momentum equation	theoretical	Discussion, Quick Exam, Problem Solving, Homework
11	4	Lab 3 Bernoulli Equation	Lab 3 Bernoulli Equation	Practical	Discussion, Quick Exam, Problem Solving, Homework
12	4	Definition of pipe flow	Pipe flow	theoretical	Discussion, Quick Exam, Problem Solving, Homework
13	4	Calculating the pipe flow losses	Loss flow in pipe	theoretical	Discussion, Quick Exam, Problem Solving, Homework
14	4	Lab 5 Bernoulli Equation	Lab 5 Bernoulli	Practical	Discussion, Quick Exam,

			Equation (losses in flow)		Problem Solving, Homework
15	4	Problems of pipe flow at different cases	Parallel flow and pranch flow	theoretical	Discussion, Quick Exam, Problem Solving, Homework
16	3	Final exam	Final exam		

Course Evaluation: Exams (5 quizzes 25%, online assignment homework 6%, classwork 5% , report 4%, mid-term exam 10%, and three-hours final exam 50%).	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Fluid Mechanics, Streeter
Main references (sources)	Fluid Mechanics, Streeter
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name: **Method of Construction and Estimation**	
Course Code: **DWE4329**	
Semester / Year: **Second semester/ 2024-2025**	
Description Preparation Date: 1/9/2024	
Available Attendance Forms: **Official working hours**	
Number of Credit Hours (Total) / Number of Units (Total) 45/3	
Course administrator's name (mention all, if more than one name)	
Name: prof .Jumaa A Hemed AL-Somaydaii # lec.AseeL .A. AL-Jader Email: jah_eng@uoanbar.edu.iq	
Course Objectives	
	Teaching the student the ability to prepare tables of quantities and their details. B- Teaching the student the ability to calculate the quantities of various buildings and facilities C- Enabling the student to know the specifications of construction materials and the appropriate dimensions for their calculation. D- Teaching the student to convert quantities into tables of quantities and bids for projects. E- Teaching the student how to deal with documents for projects F- That the student becomes able to calculate the different geometric shapes and proportions of materials used
Teaching and Learning Strategies	
Strategy	. The student knows the construction methods used on the work site.

	2. The student learns the methods and concepts of calculating different quantities for construction paragraphs. 3. Teach the student how to analyze quantities into their original sources. 4. The student will be able to convert calculated quantities into tables of quantities according the main specifications.

Course Structure

Evaluation method	Teaching method	outcomes Name of unit/course or subject	Required learning	Hours	Week
Discuss, solve problems	Theoretical	An introduction to construction methods and types of Estimating	General definition of the topic	3	Fifty-thir
Discussion, quick exam, problem solving	Theoretical	Tables of quantities and units used Dividing the construction project into the main activities	Knowledge and understanding	3	Fifty-fou
Discussion, homework	Theoretical	Calculate the quantities of excavation and filling for buildings	Design considerations	3	Fifty-fift
Discussion, quick quiz	Theoretical	Calculation of quantities of concrete parts and molds for buildings 1	Knowledge and understanding	3	Fifty-sixt
Discuss, solve problems	Theoretical	Analysis of quantities of construction work	Design considerations	3	Fifty-sev
discussion	Theoretical	Calculation of quantities of concrete parts and molds for buildings 2	Knowledge and understanding	3	Fifty-eigl
	Theoretical	**Monthly exam**	Exam and review	3	Fifty-nint
Discussing problem solving, homework	Theoretical	Finishing works for buildings	Scoop, understand and design	3	Sixtieth.
Discussion, quick exam, problem solving	Theoretical	Analyzing the amounts of finishing works	Design considerations	3	Sixty-firs
Discuss your homework	Theoretical	Earth excavation works: digging and filling	Design considerations	3	Sixty-sec
Discussion, quick quiz	Theoretical	Building and construction equipment	Knowledge and understanding	3	Sixty-thir
Discussion, quick quiz	Theoretical	Estimating labor, materials and equipment	Knowledge and understanding	3	Sixty-fou
discussion	Theoretical	Profit margins, overheads and cost sections	Knowledge and understanding	3	Sixty-fift
discussion	Theoretical	Engineering	Design and	3	Sixty-six

		specifications for construction works	cognitive considerations		
Discuss, solve problems	Theoretical	Preparing reports and bills of quantities	Knowledge and understanding	3	Sixty-sev
2nd Course Exam				3	Sixty-eig

Course Evaluation	
Midterm exam#1(15%)+MidTErmexam#2(15%)+HW(5%)+Quiz(5%)+ Final exam(60%)	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Estimating and costing in civil Engineering By: B.N.DUTTA 2012 Civil Estimating. costing and valuation Quantity Surveying for building and civil Eng. works: By P.LBhasin and S.Chand New Delhi CIVIL ESTIMATING and Costing :A.K.UPADHYAY 2010 Construction Equipment Planning and Methods Muhammad Ayoub Al-Azzi 1985
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name: Remote Sensing	
Course Code: DWE 4312	
Semester / First/ Year:2024-2025	
Description Preparation Date:25/12/2024	
Available Attendance Forms: Attendance	
Number of Credit Hours (Total) / Number of Units (Total)	
80 ours distributed as follows: 5 hours per week	
Course administrator's name (mention all, if more than one name)	
Name: Dr. Prof. Khamis N. Sayl, Dr. Ahmed Saud Email: knsayl@uoanbar.edu.iq	
Course Objectives	
Course Objectives	• *Students will gain the concepts and foundation of remote sensing.* • Science – *Scientific procedures in remote sensing show the stud the necessity of types of remote sensing data to extract differ information for dams and water resources* Understand the princ of angles • *Students will use GIS tools for drawing thematic maps for w*

	resources projects
Teaching and Learning Strategies	
Strategy	Theoretical + applied + electronic lectures recorded using Google Classroom with W Board in an interactive manner

Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	5 h		*Concepts foundations Remote Sensing*		Short exam + assignme + attendance participation
2	5 h		*Concepts foundations Remote Sensing*	Lectures practical	Short exam + assignme + attendance participation
3	5 h		*Concepts foundations Remote Sensing*	Lectures practical	Short exam + assignme + attendance participation
4	5 h		*Elements Photograph systen*	Lectures practical	Short exam + assignme + attendance participation
5	5 h		*Elements Photograph systen*	Lectures practical	Short exam + assignme + attendance participation
6	5 h		*Remote Sens scanning systems*	Lectures practical	Short exam + assignme + attendance participation
7	5 h		*Remote Sens scanning systems*	Lectures practical	Short exam + assignme + attendance participation
8	5		*Interpretation Aerial Photogra for Investigations.*	Lectures practical	Short exam + assignme + attendance participation
9	5		*Interpretation Aerial Photogra for Investigations.*	Lectures practical	Short exam + assignme + attendance participation
10	5		*Interpretation Aerial Photogra for Investigations*	Lectures practical	Short exam + assignme 11+ att12endanceparticipatic
11	5		*GIS*	Lectures practical	Short exam + assignme + attendance participation
12	5		*GIS*	Lectures practical	Short exam + assignme + attendance participation
13	5		GIS	Lectures practical	Short exam + assignme + attendance

					participation
14	5		GIS	Lectures practical	Short exam + assignme + attendance participation
15			**exam**		

Course Evaluation	
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	*Elementary Surveying* *An Introduction to Geomatics*
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name:
Concrete technology
Course Code:
DWE 2309
Semester / Year:
1st/ 2024-2025
Description Preparation Date:
25/12/2024
Available Attendance Forms:
Classroom attendance
Number of Credit Hours (Total) / Number of Units (Total)
90/6
Course administrator's name (mention all, if more than one name)
Name: Assisst.prof:Dr.ghassan subhi Jameel Dr. Ahmed dalaf ahmed Email: ghassan.alkubaisi@uoanbar.edu.iq
Course Objectives

Course Objectives	In this course, – Concrete Technology students will learn: 1. Types of cement 2. Quality of aggregates 3. Sieve analysis of aggregate 4. Properties of fresh concrete 5. Design of concrete mixtures 6. Testing of cement and concrete

Teaching and Learning Strategies	
Strategy	Providing students with the basics and topics related to previous educatio outcomes and the skills to solve practical problems through presentati lecture, or conducting experiments. 2- Solving a group of practical and applied examples by the subject teacher. 3- Through discussion, students participate in solving some practical problems. 4- Daily surprise and continuous weekly tests. 5- Directing students to some websites to benefit from them.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
the first	3	1	Cement industry	Classroom	exams
the second	3	1	Types of cement		
the third	3	2	Concrete aggregate		
Fourth	3	2	Types of aggregates		
Fifth	3	2	Aggregate modeling		
Sixth	3	2	Sieve analysis		
Seventh	3	1+2	Midterm exam		
Eighth	3	3	Soft concrete		
Ninth	3	3	Fresh concrete tests		
tenth	3	4	Design of concrete mixes		
eleventh	3	4	Design of concrete mixes		
twelfth	3	5	Properties of hardened concre		
thirteenth	3	5	Compressive strength		
fourteenth	3	5	concrete		
fifteenth	3	6	Tensile properties of concrete		
sixteenth	3	6	Elasticity, shrinkage and cree		
			Durability of concrete		

Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc

Learning and Teaching Resources

Required textbooks (curricular books, if any)	Concreet technology
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name:
Calculus III
Course Code:

ENG 008
Semester / Year:
2024-2025
Description Preparation Date:
25/12/2024
Available Attendance Forms:
Number of Credit Hours (Total) / Number of Units (Total)
150 hr 6 units
Course administrator's name (mention all, if more than one name)
Name: Dr. Mhannad Haqii , Lec. Hend Saad Zayan Email: hind.saad@uoanbar.edu.iq
Course Objectives

Course Objectives	To study infinite series and to extend the concepts from one variable calculus to functions of several variables and vector valued functions. These objectives include: • Convergence tests • Power Series • Taylor Series • Representations of Functions by Taylor Series • representations and operations with functions • vector functions • directional derivatives • gradient • tangent planes

Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in the delivery of the Calculus-III cou is to encourage students to understand and analyze Vector problems and use principles in solving problems related to applications of vector valued funct like function with several variables and find surface area in three dimens coordinates, while improving and expanding their critical thinking skills at same time. This will be achieved through classes and interactive tutorials.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Rectangular Coordinat systems in 3-space. Vectors		Theoretical	Daily exams H.W
2	4	Dot product, projections. Cr product		Theoreti	Daily exams H.W
3	4	Parametric equations of a line. Planes in space		Theoreti	Daily exams H.W
4	4	Introduction to vector-valued		Theoreti	Daily exams H.W

		functions. Calculus of vector-valued functions			
5	4	Change of parameters, Ar Length. Unit Tangent, Norm and Binormal vectors		Theoreti	Daily exams H.W
6	4	Curvature		Theoreti	Daily exams H.W
7	4	Quadric Surfac Functions of tv or more variab		Theoreti	Daily exams H.W
8	4	Limits and continuity. Par derivatives		Theoreti	Daily exams H.W
9	4	Differentiabilit Local Linearity The Chain rule		Theoreti	Daily exams H.W
10	4	Directional derivatives and gradients. Tangent planes and normal vectors		Theoreti	Daily exams H.W
11	4	Maxima and minima of functions of tw variables.		Theoreti	Daily exams H.W
12	4	Double integra Double integra over non rectangular regions		Theoreti	Daily exams H.W
13	4	Double integra in polar coordinates. Triple integrals		Theoreti	Daily exams H.W
14	4	Cylindrical and spherical coordinates.		Theoreti	Daily exams H.W
15	4	Triple integrals cylindrical and Spherical coordinates		Theoreti	Daily exams H.W
Course Evaluation					
Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc					
Learning and Teaching Resources					

Required textbooks (curricular books, if any)	Calculus, by H. Anton, I. Bivens, and Davis, 8th Edition, 2002, Wiley
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name: Environmental Engineering
Course Code: DWE3320
Semester / Year: Spring /2024-2025
Description Preparation Date: 25/12/2024
Available Attendance Forms: Theoretical
Number of Credit Hours (Total) / Number of Units (Total) 3/45
Course administrator's name (mention all, if more than one name)
Name: Arkan Dhari Jalal and Yasir Abdulmajeeed Muhammad Email: aniyaser@uoanbar.edu.iq, arkan.dhari@uoanbar.edu.iq
Course Objectives

Course Objectives	1-.Identify the quantity, quality, types and characterization of wastewater generated 2.To understand the properties and the design criteria of the conventional wastewater treatment plant (WWTP). 3. To learn the objectives and methods of sewage treatment and to study the features and function of different primary treatment units. 4. To study the features and function of different secondary treatment units. 5. To learn the objectives and methods of sewage disposal. 6. To learn the objectives and methods of sludge treatment
Teaching and Learning Strategies	
Strategy	This course introduces fundamental concepts in the field of wastewater engineering and environmental engineering. The student will learn about wastewater and their characteristics, wastewa treatment, methods, processes, primary, biological , tertiary and advanced treatme Activated sludge processes , extended aeration processes .

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	3	Apply math an science principl in the design an	Wastewater treatmer	Theoretical applied lecture electronic lectu	Short exams Homework Activity +

		analysis process		recorded us Google Classro with White Bo in an interact manner	attendance Monthly exams Oral exam final exam
2	3	Apply math an science principl in the design an analysis process	Sanitary sewage flov estimation	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
3	3	Apply math an science principl in the design an analysis process	Characteristics	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
4	3	Apply math an science principl in the design an analysis process	Sewerage	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
5	3	Apply math an science principl in the design an analysis process	Types and	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
6	3	Apply math an science principl in the design an analysis process	Primary treatment	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
7	3	Apply math an science principl in the design an analysis process	Screens	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo	Short exams Homework Activity + attendar Monthly exams Oral exam final exam

				in an interact manner	
8	3	Apply math an science principl in the design an analysis process	Grit chamber	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
9	3	Apply math an science principl in the design an analysis process	Primary sedimentatio tanks	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
10	3	Apply math an science principl in the design an analysis process	Secondary	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
11	3	Apply math an science principl in the design an analysis process	Biological	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
12	3	Apply math an science principl in the design an analysis process	Biological	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
13	3	Apply math an science principl in the design an analysis process	Trickling	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
14	3	Apply math an	Sludge	Theoretical	Short exams

		science principl in the design an analysis process		applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Homework Activity + attendar Monthly exams Oral exam final exam
15	3	Apply math an science principl in the design an analysis process	Advanced	Theoretical applied lecture electronic lectu recorded us Google Classro with White Bo in an interact manner	Short exams Homework Activity + attendar Monthly exams Oral exam final exam
16	3	Apply math an science principl in the design an analysis process	Final Exam		

Course Evaluation	
Midterm exam#1(15%)+MidTErmexam#2(15%)+HW(5%)+Quiz(5%)+lab(10%)+ Final exam(50%)	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	WATER SUPPLY AND SEWERAGE E.W.STEEL & TERENCE J .MCGHEE , FIF Edition
Main references (sources)	
Recommended books and references (scientific journals, reports...)	Chang R. & College W.,Chemistry, McGraw Hill 9th ed., 2007
Electronic References, Websites	

Course Description Form

Course Name:
Foundations Engineering
Course Code:
DWE3311
Semester / Year:
Second semester/ 2023-2024
Description Preparation Date:
25/12/2024
Available Attendance Forms:
In class – Weekly
Number of Credit Hours (Total) / Number of Units (Total)
3/2
Course administrator's name (mention all, if more than one name)
Name: Nabeel S. Mahmood, PhD Email: nabeelshm@uoanbar.edu.iq

Course Objectives	
Course Objectives	• Understand the practical concepts of soil behavior and their interaction with water and structures. • Apply the knowledge of soil properties and basic mechanics to analyze and design foundations and earth structures that are related to Dams and Water Resources Engineering program.
Teaching and Learning Strategies	
Strategy	4. Lecture-based learning 5. Problem Based Learning (PBL) 6. Directed Discussion

Course Structure

Week	**Hours**	**Required Learning Outcomes**	**Unit or subject name**	**Learning method**	**Evaluation method**
1	3	Apply math and science principles in the design and analysis process.	Site Investigations	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
2	3	Apply math and science principles in the design and analysis process.	Site Investigations	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
3	3	Apply math and science principles in the design and analysis process.	Site Investigations	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
4	3	Design major geotechnical structures from a geotechnical perspective. Analyze and interpret field and laboratory data to obtain design properties.	Bering Capacity	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
5	3	Design major geotechnical structures from a geotechnical perspective. Analyze and interpret field and laboratory data to obtain	Bering Capacity	Lecture-based learning Problem Based Learning	Discussion, quick exam, problem solving,

		design properties.		(PBL) Directed Discussion	homework
6	3	Design major geotechnical structures from a geotechnical perspective. Analyze and interpret field and laboratory data to obtain design properties.	Bering Capacity	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
7	3	Design major geotechnical structures from a geotechnical perspective. Analyze and interpret field and laboratory data to obtain design properties.	Bering Capacity	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
8	3	Design major geotechnical structures from a geotechnical perspective. Analyze and interpret field and laboratory data to obtain design properties.	Earth Retaining Structures	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
9	3	Design major geotechnical structures from a geotechnical perspective. Analyze and interpret field and laboratory data to obtain design properties.	Earth Retaining Structures	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
10	3	Design major geotechnical structures from a geotechnical perspective. Analyze and interpret field and laboratory data to obtain design properties.	Earth Retaining Structures	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
11	3	Design major geotechnical structures from a geotechnical perspective. Analyze and interpret field and laboratory data to obtain design properties.	Deep Foundations	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework

12	3	Design major geotechnical structures from a geotechnical perspective. Analyze and interpret field and laboratory data to obtain design properties.	Deep Foundations	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
13	3	Design major geotechnical structures from a geotechnical perspective. Analyze and interpret field and laboratory data to obtain design properties.	Deep Foundations	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
14	3	Design major geotechnical structures from a geotechnical perspective. Analyze and interpret field and laboratory data to obtain design properties.	Slope Stability	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
15	3	Design major geotechnical structures from a geotechnical perspective. Analyze and interpret field and laboratory data to obtain design properties.	Slope Stability	Lecture-based learning Problem Based Learning (PBL) Directed Discussion	Discussion, quick exam, problem solving, homework
16		Exam			

Course Evaluation	
1- Monthly exams: 20% 2- Daily exams: 10% 3- Lab: 10% 4- Commitment to working hours + daily participation: 10% 5- Final exam: 50%	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Foundation Design – Principles and Practice, Third Edition, by Donald P. Coduto, 2014, Pearson Education, Inc.
Main references (sources)	
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name: **Ethics and Leader Skills**	
Course Code: ENG012	
Semester / 2024-2025	
Description Preparation Date:26-12-2024	
Available Attendance Forms: Classroom presence	
Number of Credit Hours (Total) / Number of Units (Total) 28	
Course administrator's name (mention all, if more than one name)	
Name: Dr. Ayad S. Aadi Email: ayad_saeed@uoanbar.edu.iq	
Course Objectives	
Course Objectives	Understand the principles of leadership skills Understand the practical applications of Ethics and Leader Skills
Teaching and Learning Strategies	
Strategy	1. Explain the basic concepts of leadership. 2. Build personal power and influence. 3. Add professional ethics to their sphere of influence 4. Give and receive feedback, listen actively, provide supportive communication, and coach and counsel team members

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1		Explain the basic concepts o leadership.			
2		Explain the basic concepts o leadership.			
3		Build power and influence.			
4		Build power and influence.			
5		Build power and influence.			
6		Build power and influence.			Exam, Report
7		Exam			
8		Study and learn the ethics of the engineering profession			
9		Study and learn the ethics of the engineering profession			
10		Study and learn the ethics of the engineering profession			Exam, Report
11		Study and learn the ethics of the engineering profession			
12		Give and receive feedback, actively listen, provide			

		supportive communication, and coach and counsel their team members.			
13		Give and receive feedback, actively listen, provide supportive communication, and coach and counsel their team members.			
14		Give and receive feedback, actively listen, provide supportive communication, and coach and counsel their team members.			Exam, Report
15		Give and receive feedback, actively listen, provide supportive communication, and coach and counsel their team members.			
16		Exam			

Course Evaluation	
The evaluation is carried out on the basis of: 1- Monthly exams 20% 2- Daily exams 10% 3- Duties 5% 4- Attendance + daily participation 5% 4- Final exam 60%	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	Management and Leadership Skills Code of Ethics
Recommended books and references (scientific journals, reports...)	
Electronic References, Websites	

Course Description Form

Course Name: Irrigation Engineering
Course Code: DWR021
Semester / Year: 1/2024
Description Preparation Date: 26/12/2024
Available Attendance Forms: in-person
Number of Credit Hours (Total) / Number of Units (Total) 150/6
Course administrator's name (mention all, if more than one name)

Name: Lecturer: Mohammed Freeh Sahab
Email: mo.freeh@uoanbar.edu.iq

Course Objectives

Course Objectives	1. Understand the basics and methods of irrigation engineering 2. Study the relationship between soil, water, crop and water consumption by the plant. 3. Study of irrigation efficiency and design of irrigation structure.

Teaching and Learning Strategies

Strategy	Combining theoretical understanding with real-world applications, such as irrigat case studies and simulations, is one way to learn in an irrigation engineering cou Emphasis should also be placed on problem solving and understanding environmen structural, and hydrological considerations.

Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	1,	Introduction: The basics Irrigation Engineering, Sources Water for Irrigation, Irrigat Water Classification, Irrigat Projects.		homewo
2		2	Duty of Water, Irrigat Efficiencies, Consumptive Use Evapotranspiration, relationship between soil water crops		Quiz, homewo
3		2,	Methods of Irrigation Engineeri Plant available water, Irrigat frequency		homewo
4		2	Infiltration of water into so Kostiakov Equation, Hor Equation		homewo
5			Field measurements of Infiltratio		quiz
6			Exam1		
7			Irrigation Structure		homewo
8			Concrete Arch Dams - II		quiz
9			Introduction about irrigation can		homewo
10			Exam 2		
11			Design of irrigation canal		homewo
12			Design of Irrigation Lining cana		quiz
13			Head work		homewo
			Exam3		
14			Drop canal		
15					

Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports .... etc	
Learning and Teaching Resources	
Required textbooks (curricular books, if any)	
Main references (sources)	Hydraulic Structures, IRRIGATI ENGINEERING AND HYDRAUL STRUCTURES, Santosh Kumar, f Edition
Recommended books and references (scientific journals, reports...)	Irrigation and Drainage Engineering, Mohammed Aymen AL-sallawi