

نموذج وصف البرنامج الأكاديمي

اسم الجامعة : تكريت

اسم البرنامج الأكاديمي او المهني: بكالوريوس هندسة بيئة

اسم الشهادة النهائية: بكالوريوس علوم في هندسة البيئة

النظام الدراسي: فصول دراسية

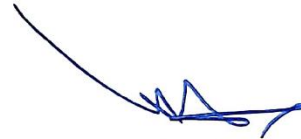
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التوقيع

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التاريخ: 2025-10-15


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التاريخ: 2025-10-15

Ministry education High Research Scientific
Directorate Supervision and evaluation



دليل وصف البرنامج
الأكاديمي والمقرر الدراسي

Department of Environmental Engineering 2026

Introduction:

The educational program is a coordinated and organized package of courses that includes procedures and experiences organized into course ,vocabulary. Its main purpose is to build and refine the skills of graduates making them qualified to meet the requirements of the labor market. It is reviewed and evaluated annually through internal or external audit .procedures and programs, such as the external examiner program

The academic program description provides a brief summary of the program's main features and courses, indicating the skills that students are working to acquire based on the academic program's objectives. The importance of this description is evident in that it represents the cornerstone for obtaining program accreditation, and it is written by the teaching staff under the supervision of the scientific committees in the .academic departments

This second edition of the guide includes a description of the academic program after updating the vocabulary and paragraphs of the previous guide in light of the developments and changes in the educational system in Iraq, which included a description of the academic program in its traditional form (annual, semester system), as well as adopting the generalized academic program description according to the Department of Studies' letter T M٣/٢٩٠٦ dated ٣/٥/٢٠٢٣ with regard to programs that .adopt the Bologna Process as the basis for their work

In this regard, we cannot but emphasize the importance of writing descriptions of academic programs and courses to ensure the smooth .running of the educational process

:Concepts and terminology

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

Course description: This provides a concise summary of the course's key features and expected learning outcomes, demonstrating whether the student has made the most of the available learning opportunities. It is derived from the program .description

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

,Program Mission: Briefly outlines the goals and activities necessary to achieve them .and identifies the program's development paths and directions

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

Curriculum structure: All courses/study materials included in the academic program ,according to the approved learning system (semester, annual, Bologna track) whether required (Ministry, University, College and Scientific Department), with the .number of study units

Learning outcomes: A consistent set of knowledge, skills, and values acquired by the student after the successful completion of the academic program. The learning outcomes for each course must be defined in a way that achieves the program's .objectives

Teaching and learning strategies are the strategies used by faculty members to enhance student teaching and learning. They are plans followed to achieve learning objectives. In other words, they describe all classroom and extracurricular activities .aimed at achieving the program's learning outcomes

1. Program Vision

To be a leading center of excellence in education, research, and community engagement in environmental engineering. We aspire to lead the development of sustainable technologies, policies, and practices that support environmental conservation both locally and globally. We look forward to a future where our graduates and research contribute significantly to addressing global environmental challenges, ensuring a cleaner, safer, and more sustainable planet for future generations.

2. Program message

Educating and empowering the next generation of environmental engineers and leaders committed to sustainable practices, who will address global environmental challenges by applying innovative and multidisciplinary approaches. We strive to provide a pivotal learning experience, conduct impactful research, and engage with communities to protect and enhance the environment.

3. Program objectives

The Department of Environmental Engineering at Tikrit University aims to provide a high-quality learning environment that equips students with the technical skills, creative thinking, and ethical values necessary for success in the environmental engineering profession. The department is committed to achieving the following:

1. Developing competent engineers: Preparing graduates with the knowledge and skills necessary to solve complex engineering problems and contribute effectively to the development of industries and society.
2. Enhancing societal impact: Engaging students and faculty in projects and activities that highlight the impact of environmental engineering solutions in addressing societal challenges.
3. Encouraging continuous growth: motivating graduates to pursue postgraduate studies and professional development, while promoting a commitment to lifelong learning and adapting to emerging global and technological trends.

4. Program accreditation

The program has received program accreditation from the Iraqi Council for
) Engineering Education Accreditation
<https://drive.google.com/file/d/1clKdQNPlibNVfIOIOkYKvQJGbMHtKQ-n/view?usp=sharing> (

5. Other external influences

6. Program structure

* comments	Percentage	Study unit	Number of courses	Program structure
	%٨.٧٥	٢١	٩	Institutional requirements
	%٢٣.٧٥	٥٧	١٠	College requirements
	%٦٧.٥	١٦٢	٣٣	Department requirements
	—	—		Summer training
	—	—		Other

.The notes may include whether the course is core or elective *

7. Program Description			
Credit Hours	Course name	Course code	Year / Level
٥	MathematicsI	MATH-101	Level One
٤	Engineering Mechanics	ENG-102	Level One
٤	computerI	UOT-003	Level One
٦	Engineering drawing	ENG-101	Level One
٥	Environmental Chemistry	ENVR-ENG-101	Level One
٢	Human rights and democracy	UOT-004	Level One
٢	Arabic LanguageI	UOT-001	Level One
٥	MathematicsII	MATH-102	Level One
٥	Material resistance	ENVR-ENG-102	Level One
٤	Environmental Physics	ENVR-ENG-103	Level One
٥	Analytical Chemistry	ENVR-ENG-104	Level One
٥	Engineering workshops	ENG-106	Level One
٢	English LanguageI	UOT-002	Level One
٥	Engineering analyses	MATH-201	Level Two
٣	Thermodynamics	ENVR-ENG-201	Level Two
٦	Principles of Fluid Mechanics	ENVR-ENG-202	Level Two
٤	computerII	UOT-031	Level Two
٥	Engineering surveying	ENVR-ENG-203	Level Two
٢	Engineering ethics	ENVR-ENG-204	Level Two
٢	Crimes of the Ba'ath regime in Iraq	UOT-005	Level Two
٣	Environmental geology	ENVR-ENG-205	Level Two
٥	Water supply engineering	ENVR-ENG-206	Level Two

٦	fluid flow	ENVR-ENG-207	Level Two
٥	Environmental Microbiology	ENVR-ENG-208	Level Two
٣	Air quality engineering	ENVR-ENG-209	Level Two
٢	Arabic LanguageII	UOT-011	Level Two
٢	English LanguageII	UOT-021	Level Two
٣	numerical analysis	MATH-301	Level Three
٥	Wastewater principles	ENVR-ENG-301	Level Three
٤	Solid waste management	ENVR-ENG-302	Level Three
٤	Hydraulic treatment plants	ENVR-ENG-303	Level Three
٤	Water quality engineering	ENVR-ENG-304	Level Three
٣	heat transfer	ENVR-ENG-305	Level Three
٦	Soil and groundwater pollution	ENVR-ENG-306	Level Three
٤	Wastewater treatment	ENVR-ENG-307	Level Three
٣	Hazardous and Radioactive Waste Management	ENVR-ENG-308	Level Three
٣	Statistics and Probability	MATH-302	Level Three
٣	mass transfer	ENVR-ENG-309	Level Three
٤	Hydrology Engineering	ENVR-ENG-310	Level Three
٣	Noise pollution	ENVR-ENG-311	Level Three
٣	Estimation and engineering specifications	ENVR-ENG-401	Level Four
٤	Elective courseI	-----	Level Four
٣	Engineering Management	ENVR-ENG-402	Level Four
٤	Simplified wastewater treatment systems	ENVR-ENG-403	Level Four
٤	Slag treatment	ENVR-ENG-404	Level Four
٤	Graduation ProjectI	ENVR-ENG-405	Level Four
٣	Engineering Economics	ENVR-ENG-406	Level Four
٤	Industrial waste management	ENVR-ENG-407	Level Four
٤	Water and sewage networks	ENVR-ENG-408	Level Four
٤	Water reuse	ENVR-ENG-409	Level Four
٣	Elective CourseII	-----	Level Four
٤	Graduation ProjectII	ENVR-ENG-410	Level Four

The above courses and hours are extracted from the study plan contained in the program's self-assessment report.

8. Expected learning outcomes of the program
Knowledge • Familiarity with the fundamental principles of mathematics, science, and environmental engineering, and their application in analyzing and solving engineering problems. • Understanding the principles of designing, operating, and developing environmental systems. • Knowledge of the environmental, economic, health, and occupational safety aspects associated with engineering processes

Skills

- Ability to identify, formulate, and solve engineering problems using appropriate scientific and engineering methods.
- Ability to design engineering processes and systems that meet technical requirements while considering safety, environmental, and sustainability factors.
- Conducting practical experiments, analyzing data, interpreting results, and drawing engineering conclusions.
- Using modern engineering technologies and software in analysis, design, and simulation.
- Effective oral and written communication, working within a multidisciplinary team, and leading it when necessary.

Values

- Adherence to professional ethics and responsibility in engineering practices.
- Respect for quality and safety standards, environmental protection, and community service.
- Fostering a culture of continuous learning and lifelong professional development.
- Commitment to a spirit of cooperation and teamwork, and respect for diversity and inclusion in the workplace

9. Teaching and learning strategies

1. **Interactive theoretical lectures** to present the basic concepts and principles in environmental engineering and supporting sciences.
2. **Practical laboratory experiments** to develop applied skills and verify engineering concepts and theories.
3. **Problem-Based Learning** To develop analytical thinking and the ability to handle complex engineering problems.
4. **Project-Based Learning** Through graduation projects and engineering designs.
5. **Summer field training** in industrial institutions and companies to link the academic aspect with practical application.
6. **Collaborative learning and teamwork** through joint activities and projects.
7. **Case studies and environmental applications** to link theoretical knowledge with real-world problems in industry.
8. **Using engineering software and computer tools** in analysis, design, and simulation.
9. **Scientific presentations and discussions** to develop communication, presentation and persuasion skills.
10. **Self-learning and continuous learning** through assignments, research, and access to modern scientific sources.
11. **Academic supervision and guidance** to support students academically and professionally throughout the various stages of study.

10. Assessment methods

The Environmental Engineering program relies on a variety of assessment methods to measure the extent to which the targeted learning outcomes have been achieved, including:

1. **Written exams** (midterm and final)
2. **Short tests(quizzes)** To measure the ongoing comprehension of the scientific material.
3. **Laboratory reports** and evaluation of practical performance in laboratories.
4. **Homework and individual and group assignments.**
5. **Engineering projects, graduation projects** , and evaluation of their reports and presentations.
6. **Seminars& Presentations** Scientific discussions.
7. **Evaluate the summer field training** through training reports and follow-up on student performance.
8. **Case studies and engineering problem solving.**
9. **Evaluating teamwork, leadership and communication skills** within joint activities and projects.
10. **Direct observation of practical performance** during laboratory and applied activities .
11. **Graduate and employer surveys and opinions from the Industry Advisory Council** to measure the achievement of the program's outputs and long-term educational goals .

11. Faculty						
Faculty members						
Faculty preparation		Special requirement s/skills (if any)		Specialization		Scientific rank
lecturer	angel			private	general	
	X			Environmental / Engineering Water Pollution	Civil Engineering	Prof. Dr. Walid Mohammed Sheet Sattam
	X			Sanitary and Environmental / Engineering Water Treatment	Building and Construction Engineering	Prof. Dr. Salwa Hadi Ahmed
	X			Water treatment	Environmental engineering	Dr. Hanin Ahmed Khudair
	X			Environmental / engineering Water quality	Civil Engineering	Dr. Nadia Nuzhat Subaih
	X			Environmental / engineering Soil pollution	Civil Engineering	Dr. Rand Rafeh Ahmed
	X			Environmental engineering	Civil Engineering	Prof. Dr. Muhammad Muthanna Numan
	X			Water treatment	Environmental engineering	Prof. Dr. Ahmed Yasser Radif
	X			Surveying engineering	Surveying engineering	A. M. Muhammad Hashim Amin
	X			Environmental engineering	Civil Engineering	Dr. Masoud Mohsen Hazza
	X			Environmental engineering	Civil Engineering	Dr. Muhammad Taha Hammoud
	X			Environmental engineering	Civil Engineering	Dr. Abbas Ali Kanoush

	X			Environmental engineering	Civil Engineering	Dr. Ahmed Khalil Ibrahim
	X			Environmental engineering	Civil Engineering	Dr. Muhammad Burhan Ali
	X			Soil Mechanics and Foundation Engineering	Civil Engineering	Dr. Hassan Ali Ahmed
	X			Project Management	Civil Engineering	M. D. Aws Silwan Noman
	X			strategy	Political Science	Dr. Hanin Ibrahim Abdullah
	X			Construction	Civil Engineering	M. Muhammad Jassim Abdul
	X			Project Management	Civil Engineering	M. Saif Saad Mohammed
	X			Production and operations	Industrial Management	M. Ahmed Hussein Khanfas
	X			Construction	Civil Engineering	M. M. Asim Hijran Aref
	X			Production and Minerals	Mechanical Engineering	M. M. Qusay Aqla Saleh
	X			Artificial intelligence	Computer Science	M.M. Alaa Ahmed Mohamed
	X			Construction	Civil Engineering	M. M. Saba Mu'ayyad Mahmoud
	X			Environmental engineering	Environmental engineering	M. M. Osama Hassan Ali
	X			Renewable energy	Mechanical Engineering	M. M. Omar Rashid Ismail
	X			Construction	Civil Engineering	M. M. sufficiency of Saleh Khader
	X			Life Sciences	Life Sciences	M. M. Amjad Abdul Latif Ahmed

	X			Environmental engineering	Environmental engineering	M. M. Hind Munim Ahmed
	X			Environmental engineering	Environmental engineering	M. M. Afnan Ihsan Abdulkarim
	X			Arabic language	Arabic language	M. M. Fares Ibrahim Issa

Professional Development
Orienting new faculty members
The Department of Environmental Engineering is committed to supporting the continuous professional development of faculty members through participation in training courses, workshops ,and scientific conferences, encouraging scientific research and publication in reputable journals and developing teaching and technical skills in line with the requirements of academic accreditation and modern learning outcomes. Orienting new faculty members The department adopts a mechanism to guide new faculty members by introducing them to the program’s mission, objectives, approved learning outcomes, study plan, and evaluation and quality assurance mechanisms. In addition, an experienced faculty member is assigned to follow up and guide the new member during their academic integration period, and to provide them with guidance related to teaching methods, preparing course descriptions, and documenting academic accreditation files.
Professional development of faculty members
The Environmental Engineering program places great emphasis on the ongoing professional .development of faculty members to enhance their academic, research, and teaching competencies This is achieved through: • Participating in training courses and workshops specializing in modern teaching methods and outcomes-based learning(OBE). • Encouraging participation in local and international scientific conferences and seminars. • Supporting scientific research and publication in reputable and internationally ranked scientific journals. • Developing technical skills and using engineering software and modern educational technologies. • Exchanging academic and research experiences with universities, scientific and industrial institutions. • Participating in quality and academic accreditation committees and continuous improvement activities. • Encouraging the acquisition of professional and specialized certifications and attendance at advanced training programs.

- Supporting the supervision of graduation projects and applied research that are related to the needs of society and industry.
- ,This professional development contributes to raising the quality of the educational process improving learning outcomes, and enhancing the ability of faculty members to keep pace with scientific and technological developments in the field of environmental engineering.

12. Admission standard

are admitted to the Bachelor of Science in Environmental Engineering program according to the central admission guidelines and regulations issued by **the Iraqi Ministry of Higher Education and Scientific Research** , and in accordance with the admission requirements adopted by Tikrit University and the College of Engineering. The following are the requirements for admission to the program:

1. The applicant must have a preparatory school certificate/scientific branch or its equivalent that is officially recognized.
2. Achieving the minimum required grade for admission to the College of Engineering according to the annual central admission plan.
3. Meeting the conditions and regulations set by the Ministry of Higher Education and Scientific Research and Tikrit University.
4. Passing the approved registration procedures, medical examination and administrative requirements.
5. Students are distributed among the engineering departments according to the admission mechanisms approved by the college and the university.

Students are accepted into the program in both **morning and evening study systems** in accordance with the applicable regulations and instructions ,.

13. Key sources of information about the program

Information regarding the Bachelor of Environmental Engineering program is based on a range of official and academic sources, most notably:

1. Academic Program Guide(Program Specification) and Program Description Documents.
2. The approved curriculum for the Environmental Engineering program
3. Coursespecifications for all courses in the program.
4. ProgramSelf-Assessment Report (SAR).
5. Student handbook and college and university academic instructions.
6. The website of the Department of Environmental Engineering at the College of Engineering – Tikrit University.

7. The website of the College of Engineering– Tikrit University.
8. The website of Tikrit University and its academic instructions and regulations.
9. Instructions of the Iraqi Ministry of Higher Education and Scientific Research regarding curricula, admission, quality assurance and academic accreditation.
10. Minutes of the Industrial Advisory Board(IAB) and reports on quality and continuous improvement.
11. Questionnaires from students, graduates, and employers are used to evaluate and develop the program.
12. Scientific references, textbooks, and specialized journals in the field of environmental engineering

14. Program development plan

Based on the department's strategic plan and the self-assessment report, the development plan for the Environmental Engineering program is as follows:

1. Developing and updating curricula periodically in accordance with labor market requirements and national and international standards for academic accreditation.
2. Enhancing the application of outcomes-based education(OBE) and linking courses to learning outcomes and educational program objectives.
3. Creating and developing modern courses in the fields of environmental systems, pollution ,reduction, renewable energy, computing tools in environmental engineering, artificial intelligence and environmental sustainability.
4. ,Expanding opportunities for applied learning through summer training, practical projects and scientific research for graduating students.
5. Developing educational and research laboratories and updating their equipment to keep pace with modern technological developments.
6. Strengthening partnerships with the industrial sector and government institutions to provide training, employment and joint venture opportunities.
7. Encouraging scientific research and innovation, and supporting the participation of faculty and students in conferences and scientific activities.
8. Developing students' skills in communication, teamwork and leadership in a way that enhances their professional readiness.
9. Increased utilization of digital technologies, e-learning, and specialized engineering software in education and training.

10. Enhancing communication with graduates, employers and the Industrial Advisory Board (IAB) to benefit from feedback in the continuous improvement of the program.
11. Completing the requirements for academic accreditation, quality assurance, monitoring performance indicators, and continuous improvement of the program.
12. Developing occupational safety and quality programs in laboratories and educational and research activities.

The program aims to continuously develop curricula, modernize laboratories, promote outcomes-based education, expand partnerships with the industrial sector, support scientific research and innovation, and develop the skills of students and faculty members, ensuring that academic accreditation requirements are met and that modern developments in the field of environmental engineering are kept up with

Program Skills Plan															
Learning outcomes required from the program															
Values				Skills				Knowledge				Essential or optional	Course Name	Course code	Year / Level
Q1	Part 1	Part 2	Part 3	B1	B2	B3	B4	A1	A2	A3	A4				
	X						X			X		essential	MathematicsI	MATH-101	-2020 First/2026
	X						X				X	essential	Engineering Mechanics	ENG-102	-2020 First/2026
			X				X				X	essential	computerI	UOT-003	-2020 First/2026
	X						X				X	essential	Engineering drawing	ENG-101	-2020 First/2026
		X				X				X		essential	Environmental Chemistry	ENVR-ENG-101	-2020 First/2026
			X	X							X	essential	Human rights and democracy	UOT-004	-2020 First/2026
			X		X			X				essential	Arabic LanguageI	UOT-001	-2020 First/2026
	X						X			X		essential	MathematicsII	MATH-102	-2020 Second/2026

	X						X				X	essential	Material resistance	ENVR-ENG-102	-۲۰۲۰ Second/۲۰۲۶
	X						X				X	essential	Environmental Physics	ENVR-ENG-103	-۲۰۲۰ Second/۲۰۲۶
	X				X					X		essential	Analytical Chemistry	ENVR-ENG-104	-۲۰۲۰ Second/۲۰۲۶
X							X			X		essential	Engineering workshops	ENG-106	-۲۰۲۰ Second/۲۰۲۶
	X						X				X	essential	English Language I	UOT-002	-۲۰۲۰ Second/۲۰۲۶
X		X						X			X	essential	Engineering analyses	MATH-201	-۲۰۲۰ Second/۲۰۲۶
X		X						X			X	essential	Thermodynamics	ENVR-ENG-201	-۲۰۲۰ Second/۲۰۲۶
	X						X			X	X	essential	Principles of Fluid Mechanics	ENVR-ENG-202	-۲۰۲۰ Second/۲۰۲۶
		X	X				X	X				essential	computer II	UOT-031	-۲۰۲۰ Second/۲۰۲۶
		X						X			X	essential	Engineering surveying	ENVR-ENG-203	-۲۰۲۰ Second/۲۰۲۶

						X	X			X	X	essential	Engineering ethics	ENVR-ENG-204	-٢٠٢٥ Second/٢٠٢٦
	X							X	X	X		essential	Crimes of the Ba'ath regime in Iraq	UOT-005	-٢٠٢٥ Second/٢٠٢٦
						X	X			X	X	essential	Environmental geology	ENVR-ENG-205	-٢٠٢٥ Second/٢٠٢٦
	X				X					X		essential	Water supply engineering	ENVR-ENG-206	-٢٠٢٥ Second/٢٠٢٦
	X						X				X	essential	fluid flow	ENVR-ENG-207	-٢٠٢٥ Second/٢٠٢٦
	X						X				X	essential	Environmental Microbiology	ENVR-ENG-208	-٢٠٢٥ Second/٢٠٢٦
	X					X	X		X	X		essential	Air quality engineering	ENVR-ENG-209	-٢٠٢٥ Second/٢٠٢٦
	X					X	X		X	X		essential	Arabic LanguageII	UOT-011	-٢٠٢٥ Second/٢٠٢٦
	X						X				X	essential	English LanguageII	UOT-021	-٢٠٢٥ Second/٢٠٢٦
X		X						X			X	essential	numerical analysis	MATH-301	-٢٠٢٥ Third/٢٠٢٦

X		X						X			X	essential	Wastewater principles	ENVR-ENG-301	-۲۰۲۵ Third/۲۰۲۶
	X						X			X	X	essential	Solid waste management	ENVR-ENG-302	-۲۰۲۵ Third/۲۰۲۶
		X	X				X	X				essential	Hydraulic treatment plants	ENVR-ENG-303	-۲۰۲۵ Third/۲۰۲۶
		X						X			X	essential	Water quality engineering	ENVR-ENG-304	-۲۰۲۵ Third/۲۰۲۶
						X	X			X	X	essential	heat transfer	ENVR-ENG-305	-۲۰۲۵ Third/۲۰۲۶
	X							X	X	X		essential	Soil and groundwater pollution	ENVR-ENG-306	-۲۰۲۵ Third/۲۰۲۶
						X	X			X	X	essential	Wastewater treatment	ENVR-ENG-307	-۲۰۲۵ Third/۲۰۲۶
	X				X					X		essential	Hazardous and Radioactive Waste Management	ENVR-ENG-308	-۲۰۲۵ Third/۲۰۲۶
	X						X				X	essential	Statistics and Probability	MATH-302	-۲۰۲۵ Third/۲۰۲۶

	X						X				X	essential	mass transfer	ENVR-ENG-309	-۲۰۲۰ Third/۲۰۲۶
	X					X	X		X	X		essential	Engineering Hydrology	ENVR-ENG-310	-۲۰۲۰ Third/۲۰۲۶
	X					X	X		X	X		essential	Noise pollution	ENVR-ENG-311	-۲۰۲۰ Third/۲۰۲۶
	X						X				X	essential	Estimation and engineering specifications	ENVR-ENG-401	-۲۰۲۰ Fourth/۲۰۲۶
X		X						X			X	optional	Elective courseI	-----	-۲۰۲۰ Fourth/۲۰۲۶
X		X						X			X	essential	Engineering Management	ENVR-ENG-402	-۲۰۲۰ Fourth/۲۰۲۶
	X						X			X	X	essential	Simplified wastewater treatment systems	ENVR-ENG-403	-۲۰۲۰ Fourth/۲۰۲۶
		X	X				X	X				essential	Slag treatment	ENVR-ENG-404	-۲۰۲۰ Fourth/۲۰۲۶
		X						X			X	essential	Graduation ProjectI	ENVR-ENG-405	-۲۰۲۰ Fourth/۲۰۲۶

						X	X			X	X	essential	Engineering Economics	ENVR-ENG-406	-۲۰۲۰ Fourth/۲۰۲۶
	X							X	X	X		essential	Industrial waste management	ENVR-ENG-407	-۲۰۲۰ Fourth/۲۰۲۶
						X	X			X	X	essential	Water and sewage networks	ENVR-ENG-408	-۲۰۲۰ Fourth/۲۰۲۶
	X				X					X		essential	Water reuse	ENVR-ENG-409	-۲۰۲۰ Fourth/۲۰۲۶
	X						X				X	optional	Elective CourseII	-----	-۲۰۲۰ Fourth/۲۰۲۶
	X						X				X	essential	Graduation ProjectII	ENVR-ENG-410	-۲۰۲۰ Fourth/۲۰۲۶

- Please situation signal in squares Interview For outputs Learning Individual from The program Subject For evaluation

Course description template

1.	name	The course
		Mathematics I
2.	: code	The course
		MATH-101
3.	Semester / Year : Annual:	
	Chapter \ / Level \	
4.	: date	numbers this Description
		2026-10-07
5.	Available attendance formats:	
	- Theoretical lectures - Practical Lessons/Exercises(Tutorial)	
6.	:Number of study hours (total) / Number of units (total)	
	/ \ ° • ECTS 6	
7.	Name of the course coordinator (if there is more than one, please .(mention it	
	Dr. Muhammad Burhan Ali	
8.	Course objectives	
	• .The ability to solve equations algebraically and graphically • .The ability to solve and analyze engineering problems • .Solve the problems using the most appropriate method • .Developing a logical understanding of scientific material • Developing students' mathematical skills so that they can apply mathematical principles and methods .solve problems in various engineering fields	
9.	Teaching and learning strategies	
	• The lectures carefully cover the essential material and analytical techniques needed, illustrating concepts .with appropriate and practical examples as much as possible • Providing students with ample time to practice the required techniques and skills through a large number) of carefully selected problems and exercises in practical sessions tutorials .(• To enhance students' understanding of mathematical concepts and develop their ability to apply them .problem-solving • .Encouraging active learning and developing analytical thinking and problem-solving skills	

10. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Lecture and exercises	Transcendental functions: exponential, logarithmic, and trigonometric functions	1	4	1
duty	Lecture and exercises	Transcendental functions (continued) and their applications	1	4	2
duty	Lecture and exercises	Solved examples and applied problems on transcendental functions	1, 2	4	3
Short test	Lecture and exercises	Integration techniques: Partial integration	2	4	4
duty	Lecture and exercises	Integration of powers and products of trigonometric functions	2	4	5
Short test	Lecture and exercises	Integration of even powers of sine and cosine	2	4	6
duty	Lecture and exercises	Midterm exam	1, 2, 5	4	7
exam	exam	Trigonometric substitutions for the cases (a^2-u^2) , (a^2+u^2) , (u^2-a^2)	2	2	8
Solving problems	Lecture and exercises	Hyperbolic functions, their	3	4	9

		derivatives and integrals			
Short test	Lecture and exercises	Inverse hyperbolic functions and their applications	3	4	10
duty	Lecture and exercises	Solved examples and applied problems on hyperbolic functions	3, 5	4	11
duty	Lecture and exercises	Series, powers, and Taylor series	4	4	12
Solving problems	Lecture and exercises	Taylor and Maclaurin series of exponential and trigonometric functions	4	4	13
+ Project Presentation	+ Problem Solving Seminar	Binomial theorem and applications of series	4, 5	4	14
final exam	exam	Comprehensive review and advanced problem solving	1-5	3	15

11. Course evaluation

He depends evaluation Differential and Integral Calculus I on principle Evaluation Continuous and evaluation Final To ensure measurement bezel verification outputs Learning Targeted . And allocated .40% of Degree College For evaluation Formative Assessment Which Includes Tests Short, and duties domestic, and costs The classroom, and the episodes academic, and projects Individual or collectively, With the aim tracking progress Students and strengthening Teach them In picture ongoing during the chapter Academic . As well It is allocated 10% for the exam Half To measure level absorption Students For concepts And the topics that Done Her study during Half the first from Chapter . As for The exam Final It represents 50% of Degree College And it is held in end the chapter Academic To assess bezel investigation Students For outputs Learning Private As per the schedule In a way comprehensive

12. Learning and teaching resources

Calculus and analytical geometry, George B. Thomas Addison - Wesley publishing company, 7th edit 1988.	Required textbooks (methodology, if applicable)
	Main references (sources)
Calculus; James Stewart, 10th edition, 2003.	Recommended supporting books and references (scientific journals, reports...)

	Electronic references, websites
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Course description template

13. : Course Name	
Engineering Mechanics	
14. : Course code	
ENG- 102	
15. Semester / Year : Annual	
Chapter \ / Level \	
16. Date this description was prepared	
2026-10-07	
17. Available attendance formats:	
Theoretical lectures Practical Lessons/Exercises(Tutorial)	
18. :Number of study hours (total) / Number of units (total)	
125	
19. Name of the course coordinator (if there is more than one, please .(mention it	
Teacher Saif Saad / Assistant Teacher Omar Rashid Ismail	
20. Course objectives	
	1. Introducing students to the basic concepts of engineering mechanics and statics. 2. Developing the ability to analyze forces and their moments and represent them geometrically. 3. Understanding the conditions for the equilibrium of bodies and applying them to various geometric problems. 4. To equip students with the skills to analyze trusses and simple structures. 5. . appropriate mathematical methods 6. Preparing students to study advanced engineering courses related engineering analysis and design.
21. Teaching and learning strategies	
	1. Theoretical lectures to explain the basic concepts and principles of engineering mechanics. 2. Solving applied problems to develop engineering analysis and calculation skills. 3. Interactive learning and discussion to enhance understanding of basic concepts.

	4. Using educational tools and engineering software to represent forces and engineering structures. 5. Exercises and homework to consolidate knowledge and develop problem-solving skills. 6. Cooperative learning through teamwork in solving engineering problems.
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22. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Lecture	a Basic principles	1	4	1
	exercises	a force analysis	1	4	2
duty	Lecture	a Torque and double	1	4	3
	exercises	a torque	1	4	4
Short test	Lecture	a Outcome	1	4	5
	exercises	a simultaneous force	1	4	6
exam	Lecture	a parallel forces	1	4	7
	exercises	a Balance	1	4	8
Short test	Lecture	a Midterm exam	1	4	9
	exercises	a Free body diagram	1	4	10
duty	Lecture	a Structures	1	4	11
	exercises	a gables	1	4	12
Short test	Lecture	a gables	1	4	13
	exercises	a center of gravity	1	4	14
exam	Midterm exam	The determinate	1	4	14
	Lecture	a of the short	1	4	15
	exercises	a friction			
	Lecture	a final exam			
	exercises				
	Lecture	a			
	exercises				
	Lecture	a			
	exercises				
	Lecture	a			
	exercises				
	Lecture	a			
	exercises				

	Lecture exercises final exam				
23. Course Evaluation \					
He depends evaluation Decision Engineering Mechanics on principle Evaluation Continuous and evaluation Final To ensure measurement bezel verification outputs Learning Targeted . And . allocated40% from Degree College For evaluation Formative Assessment Which Includes Tests Short, and duties domestic, and costs The classroom, and the episodes academic, and projects Individual or collectively, With the aim tracking progress Students and strengthening Teach them In picture ongoing during the chapter Academic . As well It is allocated10% For the exam Half To measure level absorption Students For concepts And the topics that Done Her study during Half the first from Chapter . As for The exam Final It represents50% of Degree College And it is held in end the chapter Academic To assess bezel investigation Students For outputs Learning Private As per the schedule In a way comprehensive					
24. Learning and teaching resources					
Engineering Mechanics-Statics, Hibbeler, RC13th Edit Pearson Prentice Hall, 2016, ISBN 978-0-13-31892-2.”		Required textbooks (methodology, if applicable)			
Engineering Mechanics-Statics, J. L. Meriam , L. G. Kr , Wiley, 5th Edition, 2003, ISBN: 0-471-26607-8		Main references (sources)			
		Recommended supporting books and references (scientific journals, reports...)			
		Electronic references, websites			

model a description The course

Computer I	1. Name The course
UOT-003	2. Code The course
Chapter \ / Level \	3. Term / Year
2026-10-07	4. Date numbers Description
My attendance - lectures theory and laboratories practical	5. Shapes the audience Available
3 ECTS / 75	6. Number Hours Study Total / Number Units The total
Name : Hind Mun'im Ahmed Al-Barid Email : hind.muneam@tu.edu.iq	7. Name responsible The course

8. Goals The course

• identification Students With development sciences computer And most important Pioneers And the stages Historical Basic . • Enable Students from to understand acting Data inside computer like order The duo And the sixth decimal and ASCII And Unicode . • identification Students Ingredients Basic For the computer like lonliness Treatment Central and memory devices Input And the output . • Development capacity Students on to understand algorithms Writing steps solution Problems Using Code Descriptive Simple . • identification Students With concepts languages Programming and comparison Formulas Basic between languages The different ones . • Enable Students from to understand systems Operation Management Files And tasks Basic in Windows environment . • development skills Students The process in Using Microsoft Word , Microsoft Excel , and Microsoft PowerPoint. • identification Students With applications computer in Organized Information intelligence artificial and interaction between man and the computer And the graphics . • Enable Students from to understand principles Networks and the internet like topology and protocols and DNS and IP . • identification Students With threats Cyber and methods Protection And reducing from Risks Digital .	Goals The course
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9. Strategies education and learning

He depends The course on Mixing between Lectures Interactive and applications The process inside The laboratory . It is being done . Use activity Line Time To understand development sciences Computer and exercises Conversion To understand acting Data and presentations Explanatory For the ingredients Physical and training Code Descriptive Algorithms , and comparisons Drafting between languages Programming and discussions systems Operation and networks and the internet Security Cyber . As well It includes The course Applications practical On Windows and Word and Excel PowerPoint from during Duties Short lessons , quizzes , discussions , activities Safia , and the project My application .	strategy
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10. Structure The course

road Evaluation	road Learning Education	name Unit / Subject	outputs Learning Required	Hours	Week
sharing Safia , activity Short , follow-up Laboratory .	a lecture Interactive , activity line Time , application My laboratory on administration Files and a painting control and manager Tasks .	development sciences Computers , Pioneers , Stations Historical + Fundamentals system Operation in The laboratory .	that He explains student development sciences computer And he mentions Most important Pioneers And the stages Historical .	3	1
exercises Transfer , duty Short , active My laboratory .	Lecture , exercises Word conversion , training on Coordination And the titles .	acting Data : Binary , Sixth Decimal , ASCII, Unicode + processing Texts 1.	that converts student between systems representation digital And he explains The meaning of ASCII and Unicode .	3	2
Questions Oral , short Word task .	Slides , pictures Videos , presentation Explanation For components , Word training on Tables And patterns .	the components Materialism For computers : CPU, memory , hardware Input Output + Processing Texts 2.	that He distinguishes student between lonliness Treatment and memory devices Input And the exit And its functions .	3	3
training inside Class , Assignment 01.	Lecture , training on Code Descriptive , Excel application on coordination Data and functions Basic .	Algorithms : Complexity , Sorting , Optimization + Excel 1.	that He writes student steps solution problem Simple Using algorithm and code My description .	3	4

a test Short 01, Activity My laboratory .	Comparisons Formulation , examples Code , Excel application on Functions Fees The graphic .	languages Programming I + Excel 2.	that recognizes student on concept languages Programming And compare between Its formulas Basic .	3	5
Discussion , evaluation first For offers .	Examples Applied , Discussion , Design slices and elements an offer My presentation .	languages Programming II + PowerPoint 1.	that It is clear student Differences between languages Programming And its uses The general public .	3	6
exam Mid Chapter , PowerPoint activity .	Review , test , training on Transfers And movements In PowerPoint.	review and exam Mid Chapter + PowerPoint 2.	that review student Concepts Previous And he applies it in a test Mid the chapter .	3	7
sharing Safia , questions Short .	Lecture discussion , structure system Operation , examples From Windows.	systems Operation I: Concept , Functions , Management Resources .	that He explains student concept system Operation and its functions Basic .	3	8
a test Short 02, discussion .	Lecture discussion , examples Applied .	systems Operation II: Structure , Management Operations and memory And the files .	that analyzes student structure system Operation and his relationship User and programs and ingredients Materialism .	3	9
activity Collective , participatory .	cases Study , presentations Visual , discussion	Applications Computer I: Systems	that It is mentioned student Applications	3	10

	Uses Engineering .	Information IS.	Organized Information in Fields Engineering And the vital .		
discussion and activities Safia .	Examples Applied , presentations Visual , discussion .	Applications Computer II: Intelligence Artificial AI and HCI interaction .	that He explains student Concepts Primary For intelligence artificial and interaction between man And the computer .	3	11
delivery an idea Project / Follow-up The project .	Offers Visual , work Collective , guidance The project .	Applications Computer III: Graphics and Review The project .	that He describes student Uses graphics Computer And develops an idea project applied basic .	3	12
activity fee Network , discussion .	Lecture , drawing plans Networks , examples Applied .	Networks : Topology , Protocols , Fundamentals Contact .	that He distinguishes student between Types Networks topology and protocols Basic .	3	13
Assignment 02, Questions Short .	Lecture examples , Process , discussion structure The internet .	Internet : Infrastructure Web , DNS, IP.	that He explains student structure Web DNS and IP concepts and mechanism a job The internet .	3	14
evaluation Project , discussion Activities , preparation	Lecture Cases , Realism , discussion , review General .	Security Cybersecurity : Threats , Attacks , Techniques Relief	that He specifies student threats Cyber The rumor He suggests	3	15

For the exam The final .		Protection + Review Final .	procedures protection suitable .		
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11. Evaluation The course

Degree	component Evaluation
4%	the duty the first
5%	Test Short the first
10%	exam Mid the chapter
4%	the duty the second
5%	Test Short the second
10%	Discussions and activities
12%	Project
50%	The exam Final
100%	the total

12. Sources Learning and teaching

Lectures and lieutenant Decision Computer I Approved in college Engineering / Department Engineering Environmental .	Books methodology Required
Brookshear, J. G., & Brylow , D. Computer Science: An Overview. Norton, P. Introduction to Computers.	the reviewer President
Stallings, W. Operating Systems: Internals and Design Principles. sources Training In Microsoft Word , Microsoft Excel , and Microsoft PowerPoint.	Books References Recommended In it
Microsoft Office Support and Training. W3Schools / MDN Web Docs for introductory web and internet concepts.Cybersecurity awareness resources from recognized academic or institutional websites.	the reviewer Electronic and sites

Course description template

25. : Course Name	
Engineering drawing	
26. : Course code	
ENG-101	
27. : Semester / Year : Annual	
Chapter \ / Level \	
28. : Date this description was prepared	
2026-10-07	
29. Available attendance formats:	
1- Lectures	
Practical exercises -٢	
30. Total study hours/total units: ١٥ • ECTS 6	
31. Name of the course coordinator (if there is more than one, please .(mention it	
Qusay Akla Saleh	
32. Course objectives	
	• Learning how to use AutoCADsoftware effectively. • Developing skills to create two-dimensional (2D) drawings ,using basic geometric elements ,including lines, circles, rectanglesetc. • Learning to edit and modify two-dimensional (2D) :graphics such as ... (Transfer, Copy, and Analog/Mirror Alignment) • Understanding how to accurately place dimensions on two-dimensional(2D) drawings to ensure accurate representation and clarity.

	- Acquire the ability to create three-dimensional (3D) drawings using basic geometric shapes and elements. - Developing skills to modify and edit 3D graphics , including moving and copying elements effectively (moving, copying)
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33. Teaching and learning strategies

The course introduces basic drawing techniques and computer-aided design (CAD) concepts through **practical** lectures

With ample time allocated for intensive practical training, student performance is assessed through continuous formative assessment (40%)

Includes short tests, Homework, lab activities, seminars, and projects—along with a midterm exam covers the initial concepts. Finally, the comprehensive final exam (60%) measures the overall theoretical and practical learning outcomes

This ensures continuous skills development and measurement. Accurate for engineering efficiency

34. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Classroom assignment	Lecture and practical exercises	Introduction Engineering Drawing	6	6	1
Classroom assignment Electronic assignment	Lecture practical exercises	Introduction Engineering Drawing	6	6	2
Classroom assignment	Lecture practical exercises	Geometric projection	6	6	3
Electronic assignment	Lecture practical exercises	Initial planning concepts Creating basic geometric shapes using drawing commands	6	6	4
Short exam Classroom assignment	Lecture practical exercises	Using assistance tool In drawing	6	6	5

Classroom assignment	Lecture practical exercises	Edit and change dra shapes using e commands	6	6	6
Short exam	Lecture practical exercises	Creating layers	6	6	7
exam	exam	Midterm exam	6	2	8
Classroom assignment	Lecture practical exercises	Two-dimensional drawing Creating plans Detailed	6	6	9
Short exam	Lecture practical exercises	Two-dimensional drawing, projections and sections	6	6	10
Classroom assignment	Lecture practical exercises	3D modeling usi extrusion and fusion	6	6	11
Classroom assignment	Lecture practical exercises	3D 3D modeling using command Rotation and other 3D modeling commands	6	6	12
Classroom assignment	Lecture practical exercises	Hatching	6	6	13
project	Lecture practical exercises	review	6	6	14
exam	exam	Final exam	6	3	15

35. Course evaluation

,will be assessed as follows: a two-hour midterm exam will account for 10% of the total grade ,and formative assessment will account for 40%. The exam is divided into two short tests (20%) ten in-person assignments (10%), three online assignments (10%), and one project (40%). The final exam, which lasts three hours, represents 30% of the overall grade, and is divided into 30% . practical and 10% theoretical components

36. Learning and teaching resources

1-Text book 1: James A. Leach, “ AutoCad 2002 companion”, 2003 . 2-Text book 2: Drawing by computer AutoCAD 2011	Required textbooks (methodology, if applicable)
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Text book 3: AutoCAD 2D Tutorials, AutoCAD 2013, By Kristen S. Kurland, 2012.	Main references (sources)
nothing	Recommended supporting books and references (scientific journals, reports...)
https://www.autodesk.com.au/campaigns/autocad-tutorials	Electronic references, websites

Course description template

37. Course Name : Environmental Chemistry	
38. ENVR-ENG-101	
39. : Chapter / Year	
Chapter \ / Level \	
40. Date this description was prepared 07-10-2026	
41. Available attendance formats:	
42. Total study hours/total units: ١٥٠/٦	
43. The name of the course coordinator (if there is more than one, please mention it) is Ahmed Khalil Ibrahim	
44. Course objectives	
	Providing general information about chemicals and how to handle them Explanation of the methods of chemical analysis of chemical compounds Calculating the quantities of reactants and products in chemical reactions Analyzing and calculating the quantity of substances that make up chemical compounds Providing detailed information about (°pH .
45. Teaching and learning strategies	
	:The learning and teaching strategy is designed to carefully cover the essential material analytical techniques needed in lectures, illustrate concepts with appropriate (and as practical

	possible) examples, and allow sufficient time students to practice techniques using a la .number of carefully selected lesson problems
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46. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
		Introduction of environmental chemistry		2	١
		Thermodynamics, Reaction heat (CHANGING IN ENTHALPY ΔH)		2	٢
		Thermodynamics, Reaction heat (CHANGING IN ENTHALPY ΔH)continued		2	٣
		Calculations involving reaction enthalpy		2	٤
		Thermal chemistry equation		2	٥
		Thermal chemistry equation continued		2	٦
		Med term exam		2	٧
		Type of enthalpies		2	٨
		Calculation methods of standard reaction enthalpy		2	٩
		Hees law method		2	١٠
		Using standard format enthalpy values		2	١١

		Using standard format enthalpy values		2	۱۲
		Auto processes		2	۱۳
		Entropy		2	۱۴
		Adsorption and ion exchange		2	۱۵

47. Course evaluation

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48. Learning and teaching resources

GENERAL CHEMISTRY	Required textbooks (methodology, if applicable)
	Main references (sources)
	Recommended supporting books and references (scientific journals, reports...)
Analytical Chemistry	Electronic references, websites

Course description template

49.	name Course : Democracy and Human Rights
	Democracy and human rights
50.	: code The course
	UOT-004
51.	Semester / Year : Annual
	Chapter \ / Level \
52.	date numbers this Description
	2026-10-07
53.	Available attendance formats:
	Theoretical lectures Seminars and classroom discussions
54.	: Number of study hours (total) / Number of units (total)
	2/50
55.	Name of the course coordinator (if there is more than one, please mention it)
	Ahmed Hussein Khanfas
56.	Course objectives
	. The ability to Understanding the basic concept of human rights , children's rights, and democracy –١ The ability to understand the historical origins of the two concepts, and to know the advantages and disadvantages .of human rights and democracy .Learning about human rights, children's rights, and democracy in Islam –٢ .Identifying the sources of human and children's rights and the characteristics and features of democracy –٣ .Understanding the impact of technological development on human rights, children's rights, and democracy—٤ Addressing concepts related to the two terms such as (globalization , civil society institutions , elections and .(referendums, good governance , human rights crimes, constitution Reviewing the guarantees that ensure human and children's rights, and guarantee the democratic system and .public rights and freedoms
57.	Teaching and learning strategies
	The learning and teaching strategy was designed to ensure that students receive comprehensive information cover the curriculum for the subject, and to achieve the curriculum's primary goal of enabling students to understand ,fundamental concepts of human rights and democracy, and to familiarize themselves with international sources guarantees, and conventions related to these terms in order to utilize them in addressing negative phenomena .society and maintaining stability. And societal peace

58. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Lectures discussions	The historical roots of human rights democracy in ancient civilizations	LO #1	٢	١
homework	Lectures discussions	Human rights children's rights, democracy in Islam	LO #2	٢	٢
Short test	Lectures discussions	Sources of human rights at the international level; features characteristics democracy	LO #3	٢	٣
homework	Lectures discussions	Human rights sources at the local domestic level; advantages democracy	LO #4	٢	٤
Short test	Lectures discussions	Human rights guarantees at the local level; components democracy	LO #5	٢	٥
homework	Lectures discussions	International human rights guarantees that ensure a democratic system	LO #6	٢	٦
Short test	Lectures discussions	Human Rights Council, elections and their importance	LO #7	٢	٧
exam	exam	Midterm exam	LO #1,2,7	٢	٨
homework	Lectures discussions	Technological development and impact on human rights, children's rights, and democracy	LO #9	٢	٩
Short test	Lectures discussions	The concept of globalization, civil society institutions	LO #10	٢	١٠

+ Homework Report	Lectures discussions	Good governance principles, standard referendum ,(	LO #11	٢	١١
Short test	Lectures discussions	Constitution and types	LO #12	٢	١٢
homework	Lectures discussions	Children's rights international conventions treaties	LO #13	٢	١٣
Short test	Lectures discussions	Crimes against humanity (genocide) and their impact on human rights children's rights, democratic systems	LO #14	٢	١٤
Short test	Lectures discussions	Contemporary democracy, human rights, child rights, and case studies of real-examples that occur in international Arab societies and Iraq	LO #15	٢	١٥

59. Course evaluation

The Democracy and Human Rights course UOT-004 is based on the principle of continuous (formative) and summative assessment to ensure the measurement of the achievement of the targeted learning outcomes. Formative assessment, which includes quizzes, homework, class assignments, seminars, and individual or group projects, accounts for ٤٠% of the total grade. This assessment aims to monitor student progress and continuously enhance their learning throughout the semester. A midterm exam, which measures students' understanding of the concepts and topics covered during the first half of the semester, accounts for ١٠% of the grade. The final exam, which represents ٥٠% of the total grade, is held at the end of the semester to comprehensively assess students' achievement of the course learning outcomes.

60. Learning and teaching resources

The book "Human Rights and Democracy" is an approved ministerial textbook for Iraqi university students	Required textbooks (methodology, (applicable
nothing	Main references (sources)

nothing	Recommended supporting books and ,references (scientific journals (...reports
nothing	Electronic references, websites

Course description template

1. Course Title : Arabic Language for Non-Specialization Departments	
2. : Course codeUOT001	
3. : Semester / Year : Annual	
Chapter \ / Level \	
4. : Date this description was prepared	
2026-10-07	
5. Available attendance forms: In-person in class	
6. : Number of study hours (total) / Number of units (total)	
7. : Name of course coordinator (if there is more than one, please state)	
Abdulrahman Zeidan Ahmed	
8. Course objectives	
	Developing language skills, memorizing some Quranic -١ .chapters, and enhancing students' love for the language Understanding how to apply grammatical rules in everyday life, and -٢ .knowing linguistic terminology in the fields of engineering and science The importance of the Arabic language in areas of daily life -٣ Using grammatical rules correctly in writing scientific reports and -٤ .research Promoting self-learning and independence in learning and encouraging students to .take the initiative in learning the Arabic language
9. Teaching and learning strategies	

	The teaching strategy is an educational method that relies on reorganizing and adapting information in a way that enables access to new information. This strategy is ,characterized by making the student active and positive, and our role is that of a guide .mentor, and planner. This enables the student to discover knowledge smoothly				
10. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
a test	Lectures	Al-Baqarah, verses ٢٦٠-٢٦٣ / Surah Al- Su Hajj, verses (١-٥)			Week ١
a test	Lectures	A noble prophetic hadith			Week ٢
a test	Lectures	/ Verses from the Mu'allaha of Amr ibn Kulth "Seven verses from the poem "Ba'iyya Ibn al-Rumi			Week ٣
a test	Lectures	Human values in pre-Islamic poetry / V conjugation (Health and Illness)			Week ٤
a test	Lectures	The abrogating letters/solar and lunar letters			Week ٥
a test	Lectures	:Parts of speech and their grammatical marks Subject and predicate			Week ٦
Midterm exam	exam	Midterm exam			Week ٧
a test	Lectures	Rules for writing punctuation marks / Meaning unfamiliar words in the Quran			Week ٨
a test	Lectures	Rules for writing the hamza			Week ٩
a test	Lectures	Common linguistic errors			Week ١٠

a test	Lectures	Lexicographical Schools			Week ١١
a test	Lectures	Arabic Rhetoric / A General Introduction Arabic Rhetoric Its definition, linguistically and technically			Week ١٢
a test	Lectures	The science of rhetoric (its definition & (types			Week ١٣
a test	Lectures	Metaphor (its definition, types, & (applications			Week ١٤
a test	Lectures	Review of the material's contents			Week ١٥
End-of-term exam	exam	End-of-term exam			Week ١٦

11. Course evaluation

(٢٠) : Short tests
 Yearly work /homework: (١٥)
 Discussions: (٥)
 (١٠) : Midterm exam
 Final exam : (٥٠)

12. Learning and teaching resources

,	Curriculum approved by the Ministry of Hig Education and Scientific Research

Course description template

13.	name	The course
		mathematicsII
14.	: code	The course
		MATH-102
15.	Semester / Year :	Annual:
		Chapter Two / Level One
16.	: date numbers this	Description
		2026-10-07
17.	Available attendance formats:	
		- Theoreticallectures
		- Practical Lessons/Exercises(Tutorial)
18.	:Number of study hours (total) / Number of units (total)	
		/\ °•ECTS 6
19.	Name of the course coordinator (if there is more than one, please	
	.(mention it	
		Dr. Muhammad Burhan Ali
20.	Course objectives	
		• .The ability to solve tangent and area problems using the concepts of limits, derivatives, and integrals • ,The ability to define the domain, the codomain, and the range of functions with two or more variat • .perform algebraic operations on them, and plot their graphs • .The ability to solve simple applied problems related to derivatives of two–variable or three–variable functi • .The ability to solve problems related to the integration of functions with two or three variables • The ability to understand that the criterion (absolute value) of a complex number is equal to the square • .of the sum of the squares of its real and imaginary parts

21. Teaching and learning strategies

- The lectures carefully cover the essential material and analytical techniques needed, illustrating concepts with appropriate and practical examples as much as possible
- Providing students with ample time to practice the required techniques and skills through a large number of carefully selected problems and exercises in practical sessions **tutorials** .(
- To enhance students' understanding of mathematical concepts and develop their ability to apply them to problem-solving
- Encouraging active learning and developing analytical thinking and problem-solving skills

22. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Short test	Vectors and vectors in three-dimensional space	1	4	1
duty	duty	Dot product and cross product of vectors	1	4	2
duty	Solving problems	Equations of lines and planes in space	1	4	3
Short test	duty	Functions with two or more variables and their derivatives	2	4	4
duty	Short test	Partial derivatives and the chain rule	2	4	5
Short test	duty	Gradients and directional derivatives	2	4	6
duty	Midterm exam	Midterm exam	1,2	4	7
exam	duty	Applications of partial derivatives (maximum)	4	2	8

		minimum, and (saddle points)			
Solving problems	Short test	Binary integrals	3	4	9
Short test	duty	Bilateral integrals in polar coordinates	3	4	10
duty	Solving problems	Converting integrals from Cartesian coordinates to polar coordinates	3	4	11
duty	Short test	Triple integrals in ,Cartesian cylindrical, and spherical coordinates	3	4	12
Solving problems	duty	:Complex numbers ,addition ,subtraction multiplication, and division	5	4	13
+ Project Presentation	Solving problems	Polar and exponential representation of complex numbers	5	4	14
final exam	final exam	Final exam	1-5	3	15

23. Course evaluation

He depends evaluation Differential and Integral CalculusI on principle Evaluation Continuous and evaluation Final To ensure measurement bezel verification outputs Learning Targeted . And allocated .40% of Degree College For evaluationFormative Assessment Which Includes Tests Short, and duties domestic, and costs The classroom, and the episodes academic, and projects Individual or collectively, With the aim tracking progress Students and strengthening Teach them In picture ongoing during the chapter Academic . As well It is allocated10% for the exam Half To measure level absorption Students For concepts And the topics that Done Her study during Half the first from Chapter . As for The exam Final It represents50% of Degree College And it is held in end the chapter Academic To assess bezel investigation Students For outputs Learning Private As per the schedule In a way comprehensive

24. Learning and teaching resources

Calculus and analytical geometry, George B. Thomas Jr.; Addi – Wesley publishing company, 7th edition, 1988.	Required textbooks (methodology, (applicable
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	Main references (sources)
Calculus; James Stewart, 10th edition, 2003.	Recommended supporting books and ,references (scientific journals (...reports
	Electronic references, websites

Course Description Template

25. Course name	
Strength of Materials	
26. : code The course	
ENVR-ENG-102	
27. Semester / Year : Annual	
Chapter Two / Level One	
28. date numbers this Description	
2026-10-07	
29. Available attendance formats:	
My presence	
30. :Number of study hours (total) / Number of units (total)	
٦/١٥٠	
31. Name of the course coordinator (if there is more than one, please .(mention it	
Name: Mohammed Jassim Abdul :EmailEng.mja@tu.edu.iq	
32. Course objectives	
	.Understanding the principles of strength of materials and the ability to apply them • Communicate effectively about classical mechanics concepts and problem-solving, in writing .in English and using mathematics .Applying critical thinking and problem-solving skills in classical mechanics applications •
33. Teaching and learning strategies	

The teaching and learning strategy is designed to carefully cover the essential material and analytical techniques in lectures, explaining concepts with appropriate (and as practical as possible) examples. It also allows students ample time to practice these techniques through a large number of carefully selected teaching problems					
34. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Tests Short Duties, a report discussions exam half , the chapter The exam The final	Lectures	Introduction	At the end of this course, the student will be able to: apply the basic physical principles of strength of materials, use action and reaction to solve basic loading problems. The physical principles presented in this course are those of classical mechanics, include the basic mathematical description of simple stress and strain, types of loading, types of beams, cylinders and thin-walled vessels, torsion in beams, and beam stresses and deflection	5	Week 1
		Strength of Materials		5	Week 2
		Definition of Strength of Materials, Action and Reaction		5	Week 3
		(and Reaction)		5	Week 4
		Simple stress		5	Week 5
		Simple stress		5	Week 6
		simple emotion		5	Week 7
		simple emotion		5	Week 8
		heat stress		5	Week 9
		Half the semester, thin-walled cylinders		5	Week 10
		thin-walled cylinder twist		5	Week 16
		Twisting in thresholds		5	
		Final exam			
35. Learning and teaching resources					
Strength of Materials by Ferdinand L. Singer and Andrew Pytel, 1982			Required textbooks (methodology, if applicable)		
			Main references (sources)		
			Recommended supporting books and references (scientific journals, reports...)		
			Electronic references, websites		

Course description template

61. : Course Name	
Environmental Physics	
62. :Course code	
ENVR-ENG-103	
63. :Chapter/Year	
Chapter Two / Level One	
64. : Date this description was prepared	
٢٠٢٦-١٠-٠٧	
65. Available attendance formats:	
Inside the classroom	
66. :Number of study hours (total) / Number of units (total)	
hours / 60	
67. : Name of course coordinator	
M.M. Afnan Ihsan Abdulkarim	
68. Course objectives	
	- Understanding how to apply basic thermodynamics to the human environment - Understanding the basic composition, structure, and dynamics of the atmosphere - Explaining how the hydrological cycle works and discussing the mechanisms of water transport in the atmosphere and underground - Discussing specific environmental problems such as noise pollution, ozone depletion, and greenhouse gases - Thermal analysis within a

	comprehensive understanding of atmospheric dynamics Discussing energy demand problems and • explaining the potential contributions of renewable energy sources to energy supply Understanding many other different topics related to our environment
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69. Teaching and learning strategies

	The learning and teaching strategy is designed to: carefully cover the essential material and analytical techniques needed in lectures, illustrate concepts with appropriate (and as practical as possible) examples and allow sufficient time for students to practice techniques using a large number of carefully selected lesson problems
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70. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Lecture and exercise	Introduction, the human environment, laws of thermodynamics. Issues	1	4	Week 1
duty	Lecture and exercise	Energy transfer processes, radiation, survival in cold and hot climates, noise pollution issues	1	4	Week 2
duty	Lecture and exercise	Atmosphere and radiation, structure and composition of the atmosphere, atmospheric pressure, escape velocity, issues	1	4	Week 3

Short test	Lecture and exercise	Ozone, ozone hole, terrestrial radiation, Earth as a black body	1	4	Week 4
duty	Lecture and exercise	Global warming and its effects, problem solving	1	4	Week 5
Short test	Lecture and exercise	Water and the hydrosphere, the hydrologic cycle	1	4	Week 6
exam		Mid-Term Exam	1	2	Week 7
duty	exam	,Physics of cloud formation, thunderstorms, problem solving	1	4	Week 8
Solving problems	Lecture and exercise	Wind, the physics of wind creation, the forces acting on air masses, problem solving	1	4	Week 9
Short test	Lecture and exercise	Friction force, problem solving	1	4	Week 10
duty	Lecture and exercise	Hurricanes and antihurricanes, even solutions for	1	4	Week 11
duty	Lecture and exercise	Earth physics, soil cycle and hydrology, water flow and evaporation	1	4	Week 12
Solving problems	Lecture and exercise	Living energy, fossil fuels, nuclear energy	1	4	Week 13

Project + Present ation	Lecture and exercise	Renewable resources, energy demand & conservation	1	4	Week 14
	Lecture and exercise	Heat transfer and thermal insulation , h loss in buildings	1	4	Week 15

71. Course evaluation

Environmental Engineering course depends Based on the principle of continuous and summative assessment to ensure the measurement of the achievement of the targeted learning outcomes, 40% of the total grade is allocated to formative assessment, which includes quizzes, homework, class assignments, seminars, and individual or group projects. This aims to monitor student progress and continuously enhance their learning throughout the semester. An additional 10% is allocated to the midterm exam to measure students' understanding of the concepts and topics covered during the first half of the semester. The final exam, representing 50% of the total grade, is held at the end of the semester to comprehensively assess students' achievement of the course learning outcomes.

72. Learning and teaching resources

	Required textbooks (methodology, if applicable)
Nigel Mason and Peter Hughes: Introduction to Environmental Physics: Planet Earth, Life and Climate, Taylor and Francis, 2001	Main references (sources)
	Recommended supporting books and references (scientific journals, reports...)
	Electronic references, websites

Course description template

36. Course Name : Analytical Chemistry	
37. ENVR-ENG-104	
38. : Chapter / Year	
Chapter Two / Level One	
39. Date this description was prepared 07-10-2026	
40. Available attendance formats:	
41. Total study hours/total units: ١٥٠/٦	
42. The name of the course coordinator (if there is more than one, please mention it) is Ahmed Khalil Ibrahim	
43. Course objectives	
	Providing general information about chemicals and how to handle them Explanation of the methods of chemical analysis of chemical compounds Calculating the quantities of reactants and products in chemical reactions

	Analyzing and calculating the quantity of substances that make up chemical compounds Providing detailed information about (°pH .
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44. Teaching and learning strategies

	:The learning and teaching strategy is designed to carefully cover the essential material analytical techniques needed in lectures, illustrate concepts with appropriate (and as practical as possible) examples, and allow sufficient time for students to practice techniques using a large number of carefully selected lesson problems
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45. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
		Introduction of analytical chemistry, quantitative analytical qualitative analysis		2	١
		Gravimetric calculations chemical analysis		2	٢
		Calculations involving concentrations of solutions physical methods, Methods, Equivalent Method		2	٣
		Dilution of solutions		2	٤
		Analysis of samples by titration with standard solution		2	٥
		Calculation of Oxidation Reduction titration		2	٦
		Equilibrium equation		2	٧

		Acid – base balance and PH solutions, Equilibrium constant		2	٨
		Expression of equilibrium constant in acidic medium		2	٩
		Expression of equilibrium constant in basic medium		2	١٠
		Calculation of pH of aqueous solution, Weak acid plus its salt		2	١١
		Titration curves, Strong acid-strong base, Weak acid-strong base		2	١٢
		strong acid – weak base, weak acid – weak base		2	١٣
		Acid-base indicator		2	١٤
		The preparatory week before the final exam		2	١٥

46. Course evaluation

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47. Learning and teaching resources

GENERAL CHEMISTRY	Required textbooks (methodology, if applicable)
	Main references (sources)
	Recommended supporting books and references (scientific journals, reports...)
Analytical Chemistry	Electronic references, websites

Course description template

48. : Course Name	
Engineering workshops	
49. : Course code	
ENG-106	
50. : Semester / Year : Annual	
Chapter Two / Level One	
51. : Date this description was prepared	
2026-10-07	
52. Available attendance formats:	
2- Lectures	
Practical exercises -٢	
53. Total study hours/total units: ١٥ • ECTS 6	
54. Name of the course coordinator (if there is more than one, please .(mention it	
Qusay Akla Saleh	
55. Course objectives	
	The course, upon completion, leads to mastery of the following workshops • Safety workshop. .hours ٢ • Measurement workshop (٣ hours)

	• Metalworking workshop, ١٢ hours • Carpentry workshop ١٢. • Welding workshop ١٢ hours • Lathe workshop ١٢ hours • Plumbing workshop ١٢ hours • Health workshops ١٢ hours • Electrical workshop (٦ hours)
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56. Teaching and learning strategies

The learning and teaching strategy is designed to cover thoroughly in lectures the , essential material and analytical techniques required for each workshop ,illustrating concepts with theoretical and practical examples whenever possible as well as allowing sufficient time for students to practice and apply these techniques through solving a carefully selected set of classroom training problems and practical training in college workshops.

57. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
duty	Lecture and practical exercises	Safety workshop and Measurement workshop		6	1
duty	Lecture practical exercises	2 Metalworking workshop		6	2
Short exam	Lecture practical exercises	2 Metalworking workshop		6	3
a report	Lecture practical exercises	2 carpentry workshop		6	4
Short exam	Lecture practical exercises	2 carpentry workshop		6	5
a report	Lecture practical exercises	2 workshop welding		6	6
exam	Lecture practical exercises	2 workshop welding Midterm exam		6	7

a report	exam	lathe workshop		2	8
a report	Lecture practical exercises	lathe workshop		6	9
Short exam	Lecture practical exercises	Plumbing workshop		6	10
project	Lecture practical exercises	Plumbing workshop		6	11
a report	Lecture practical exercises	Health workshops		6	12
a report	Lecture practical exercises	Health workshops		6	13
a report	Lecture practical exercises	Electrical workshop		6	14
exam	exam	Final exam		3	15

58. Course evaluation

,will be assessed as follows: a two-hour midterm exam will account for 10% of the total grade and formative assessment will account for 40%. It is divided into 3 short tests (10 %), in addition to two assignments (10 %), 1 reports (10 %), and one project (10 %). The final exam .which lasts three hours, represents 20% of the total assessment

59. Learning and teaching resources

1-Text book 1: James A. Leach, “ AutoCad 2002 companion”, 2003 . 2-Text book 2: Drawing by computer AutoCAD 2011	Required textbooks (methodology, if applicable)
Text book 3: AutoCAD 2D Tutorials, AutoCAD 2013, By Kristen S. Kurland, 2012.	Main references (sources)
nothing	Recommended supporting books and references (scientific journals, reports...)
https://www.autodesk.com.au/campaigns/autocad-tutorials	Electronic references, websites

Course description template

1. Course Name:	English Language 1
2. Course code:	UOT-002
3. Semester/Year:	Chapter Two / Level One
4. Date the description was prepared:	2026-10-07
5. Available forms of attendance:	
6. Number of study hours (total) / Number of units (total):	45/2
7. Name of the course coordinator (remember all names if there is more than one):	Name: Hind Munim Ahmed Email: hind.muneam@tu.edu.iq
8. Course Objectives	
Course Objectives	• Defining technical communication and explaining its importance in engineering and professional environments. • Identifying the audience, purpose, and type of technical communication appropriate for different engineering situations. • Preparing and delivering effective technical presentations using a clear structure, appropriate visual aids, confident body language, and audience interaction techniques. • Participate actively in technical discussions through active listening, constructive contribution, respectful communication, and problem-solving skills. • Writing organized technical documents such as incident reports, progress reports, research reports, laboratory reports, and field reports. • Create and use clear tables, charts, and engineering graphs to accurately display and interpret technical data. • Writing professional correspondence, including formal letters, memos, emails, cover letters, and resumes. • Reviewing, editing, and proofreading technical documents to improve clarity, conciseness, accuracy, organization, grammar, and professional style.
9. Teaching and learning strategies	
strategy	The course is delivered through a combination of interactive lectures, practical exercises, group work, presentations, technical discussions, and written assignments. The teaching methodology focuses on developing students' ability to communicate technical and engineering information clearly through written, oral, visual, and professional forms of communication.

10. Course Structure					
Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation Method
01	3	The student will be able to define technical communication, explain its importance, identify its types, and understand the role of the audience and purpose in technical writing.	Introduction to Technical Communication	Interactive lecture, classroom discussion, examples of technical documents, group activity.	Collective task: Prepare a sample technical communication document for a specific audience.
02	3	The student will be able to identify the types of technical communication and choose the appropriate type according to the audience and purpose.	Types of technical communication and target audience	Lecture, group discussion, examples of documents.	A short assignment, a group activity.
03	3	The student will be able to apply the basic steps of the writing process to produce a clear and concise technical communication.	Technical writing process	Guided training, written exercises, feedback from colleagues.	Assignment: Prepare a sample technical document.
04	3	The student will be able to identify the objectives and types of technical presentations.	Technical Presentations I	Interactive lecture, examples, group work.	Choosing a theme for the group presentation.
05	3	The student will be able to prepare a structured technical presentation based on the purpose, audience, content, and visual aids.	Technical Presentations II	Presentation planning workshop, teamwork.	Delivering the presentation outline.
06	3	The student will be able to give a technical presentation using appropriate voice, body language, audience interaction, and question-answering skills.	Presenting technical proposals	Demonstration presentation, presentation training, feedback from colleagues.	Evaluate the oral presentation.
07	3	The student will be able to give a technical presentation using appropriate voice, body language and visual aids, while interacting with the audience and answering questions.	Preparing and delivering technical presentations	Demonstration, video-based learning, presentation training, feedback.	Resubmitting previous work and getting feedback.
08	3	The student will be able to participate actively in technical discussions, apply active listening, make constructive contributions, and	Technical discussions in engineering fields	Problem-based learning, group discussion, brainstorming, collaborative learning.	A group discussion about an engineering problem such as treating industrial waste in an

		discuss engineering problems.			environmentally friendly way.
09	3	Midterm exam.	Midterm exam	Editorial review and evaluation.	Midterm exam.
10	3	The student will be able to recognize the structure of incident reports and progress reports and write clear technical content for engineering situations.	Technical writing in engineering fields I	Interactive lecture, report analysis, writing practice, classroom exercises.	Classroom training on writing technical reports.
11	3	The student will be able to distinguish between a research report, a laboratory report, and a field report, and to prepare their main sections correctly.	Technical Writing in Engineering Fields II	Lecture, report structure analysis, guided writing, individual/group practice.	Written training on different types of engineering reports.
12	3	The student will be able to prepare the sections of the progress report, including challenges, future plans, results, and recommendations.	Engineering Reports I	Practice writing reports, peer review.	Submitting part of the technical report.
13	3	The student will be able to write and organize the methodology, results, discussion, conclusions, and recommendations in engineering reports.	Engineering Reports II	Practice writing reports, peer review.	Submitting part of the technical report.
14	3	The student will be able to create tables and engineering drawings and use diagrams to clearly display and interpret technical data.	Creating engineering tables and graphs	Practical exercise, visual data analysis, creating tables/charts, teamwork.	Prepare the course report using tables, graphs, results, discussion, conclusions, and recommendations.
15	3	The student will be able to write professional correspondence used in engineering contexts, including letters, memos, emails, cover letters, and resumes.	Professional correspondence	Lecture, writing workshop, examples, individual training.	A classroom activity about professional correspondence.

11. Evaluation The course	
The exam Half : 10 , the offer Presentation : 10 , discussion Group : 10 , Assignments : 10 Activity Class : 10 The exam Final : 50	
12. Sources Learning and teaching	
Books methodology Required (if I found	
the reviewer Main (Sources)	Borowick, JN <i>Technical Communication and Its Applications</i> . Prentice Hall. This is suitable as the main reference because the uploaded lectures refer to <i>Technical Communication and Its Applications</i> , especially for technical

	presentations.
Books References Recommended In it (magazines) Scientific, Reports ...)	
the reviewer Electronic, Sites	

Course description template

60. : name The course	
Engineering analyses	
61. : code The course	
MATH-201	
62. Semester / Year : Annual	
Chapter \ / Level \	
63. date numbers this Description	
2026-10-07	
64. Available attendance formats:	
My presence	
65. :Number of study hours (total) / Number of units (total)	
6/150	
66. Name of the course coordinator (if there is more than one, please mention .(it	
Mohammed Jassim Abdul	
67. Course objectives	
	Developing an understanding of the different mathematical methods used .modeling engineering applications .The ability to apply and solve mathematical models for engineering problems
68. Teaching and learning strategies	
Engage students in interactive learning activities such as group discussions, case studies, and problem-solving exercises. Encourage their active participation in class by asking questions, sharing their ideas .and collaborating with their classmates Focus on conceptual understanding before delving into mathematical derivations. Help students grasp fundamental principles and theorems, then demonstrate how to apply these concepts mathematically to .solve geometric problems	

,Use a variety of assessment methods to evaluate students' understanding and progress. Include quizzes assignments, projects, and exams that measure their analytical skills, problem-solving abilities, and .critical thinking

69. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short tests	Lectures	First-order ordinary differential equations: separable equations	Upon completion of this course, students will be able to	5	Week 1
Duties		First-order ordinary differential equations: linear equations	Identifying, formulating,	5	Week 2
		perfect equations	solving engineering problems	5	Week 3
Report		Ordinary second-order differential equations	Using mathematical analytical tools to solve engineering problems	5	Week 4
		homogeneous; non-homogeneous	Communicate effectively	5	Week 5
Discussions		Second-order ordinary differential equations: Euler's equation	Working efficiently within teams on engineering projects	5	Week 6
Midterm exam		;Cauchy differential equations	Applying engineering principles to real-world problems	5	Week 7
		solutions to power series		5	Week 8
		Simultaneous linear differential equations		5	Week 9
		Simultaneous linear differential equations		5	Week 10
Final exam		Special functions: Gamma function, midterm exam		5	Week 11
		Special functions: Euler's function		5	Week 12
		Laplace transform		5	Week 13
		The general method, convolution special functions		5	Week 14
		Laplace transform: displacement theorems, differentiation		5	Week 15
		,integration of transform solving differential equations using the Laplace transform		5	Week 16
		,Fourier series: Euler formula half-range expansion		5	Week 17
		Fourier transform: Properties of the Fourier transform, solving differential equations using Fourier transform		5	Week 18

		Properties of the perpendicular of sine and cosine functions ,Partial differential equations separation of variables (PDEs) (equations ,Partial differential equations separation of variables (PDEs) (equations Final exam			
70. Course evaluation					
71. Learning and teaching resources					
Advanced Engineering Analysis C. Ray Wylie . Advanced Engineering Mathematics, 5th ed., D Zill and M. R. Cullen .			Required textbooks (methodology, if applicable)		
			Main references (sources)		
			Recommended supporting books and references (scientific journals, reports...)		
			Electronic references, websites		

Course description template

72. : Course Name	
Thermodynamics	
73. : Course code	
ENVR-ENG-201	
74. Semester / Year : Annual	
First semester / Level two	
75. Date this description was prepared	
2026-10-07	
76. Available attendance formats:	
• In-person lectures • Practical lessons (solving problems)	
77. :Number of study hours (total) / Number of units (total)	
• Total course load : ١٠٠ hours/semester • Weekly hours : ٣ hours • Number of units(ECTS): 4	
78. Name of the course coordinator (if there is more than one, please mention it)	
Name : Dr. Ahmed Yasser Rad Academic Title : Lectu Academic Qualification : P Department : Environmental Engineeri College : Engineering – Tikrit Univers Email: ahmed.y.radeef@tu.edu.iq	
79. Course objectives	
	1. To provide environmental engineering students with a comprehensive understanding of the basic concepts and principles of thermodynamics

	2. ,Introducing students to thermodynamic systems, the properties of pure materials, and energy transfer mechanisms 3. Enabling students to apply the first law of thermodynamics to closed systems and control volumes 4. Developing the ability to analyze engineering systems using mass–energy balancing 5. Explaining the role of thermodynamics in improving energy efficiency and reducing environmental impacts 6. Linking the principles of thermodynamics to applications in environmental engineering, sustainability, and energy management
80. Teaching and learning strategies	
	- Theoretical lectures to explain the basic concepts of thermodynamics • - Practical sessions for solving mathematical problems related to energy and thermal systems • - Discussion of real-world engineering and environmental examples and case studies • - Individual assignments to develop skills in analysis, deduction, and problem-solving • - A mini-project or seminar on the applications of thermodynamics in environmental engineering • - Using modern educational tools to support the understanding of theoretical and applied concepts •
81. Course structure	

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	a lecture	Introduction and basic concepts	Understanding the basic concepts thermodynamics	۳	1
duty	a lecture	Introduction and basic concepts (continued)	Understanding thermodynamic systems and properties	۳	۲
a test	a lecture	Energy, energy transfer, general energy analysis	Understanding the forms of energy and the mechanism of its transfer	۳	۳
duty	Issues	Energy, energy transfer, general energy analysis (continued)	Applying energy balance principles	۳	۴
Short test	a lecture	Properties of pure substances	Identifying the properties of pure substances	۳	۵
duty	Issues	Properties of pure substances (continued)	Analysis of relationships between thermodynamic properties	۳	۶
exam	—	Midterm exam	—	—	۷
duty	a lecture	Energy analysis of closed systems	Application of the First Law of Thermodynamics	۳	۸
a test	Issues	Energy analysis of closed systems (continued)	Solving energy problems for closed systems	۳	۹
project	a lecture	Mass and energy analysis control volumes	Understanding control volumes	۳	۱۰
evaluation	Issues	Mass and energy analysis control volumes (continued)	Mass and energy balance application	۳	۱۱
duty	a lecture	Engineering applications thermodynamics	Applying the principles of thermodynamics in engineering	۳	۱۲
a test	Issues	Engineering applications thermodynamics (continued)	Analysis of performance of engineering systems	۳	۱۳
Seminar	discussion	Applications of thermodynamics in environmental engineering	Understanding environmental applications of thermodynamics	۳	۱۴

evaluation	discussion	Environmental Thermodynamics Applicat (continued)	Linking energy conc with environme sustainability	۳	۱۰
Short test	a lecture	Introduction to Mass Transfe	Understanding transfer concepts	n 3	
82. Course evaluation					
% Short tests: ۲۰ • % Online assignments: ۱۰ • Project: ۰% • Seminar: ۰% • % Midterm exam : ۱۰ • Final exam: ۰% •					
83. Learning and teaching resources					
Çengel , YA, & Boles, .M Thermodynamics: An Engineering Approach, 5th Edition, McG Hill, 2006 .			Required textbooks (methodology, if applicable)		
Estop, TD, & McConkey, .A Applied Thermodynamics for Engineering Technologists, Edition, 2009 .			Main references (sources)		
Moran, MJ, Shapiro, HN, Boettner, DD, & Bailey, M Fundamentals of Engineering Thermodynamics, 9th Edition.			Recommended supporting books and references (scientific journals, reports...)		
Multiple electronic sources			Electronic references, websites		

Course description template

73.	of Fluid Mechanics Principles : Course Name
74.	:Course codeENVR-ENG-202
75.	First Semester/Level Two : Semester/Year: Annual
Chapter \ / Level ʃ	
76.	: Date this description was prepared 2026-10-07
77.	Available attendance formats: + Theoretical lectures + Practical application Practical laboratory
78.	:Total study hours/total unitsECTS 6/150
79.	Name of the course coordinator (if there is more than one, please list them). Dr. Ahmed Saadi Mahmoud
80.	Course objectives
	aims to help meet the need to gather information related to the principles of fluid This cou .mechanics and static fluids
81.	Teaching and learning strategies
	The learning and teaching strategy was designed to: carefully cover the essential material and necess analytical techniques in lectures and to clarify Concepts are presented with appropriate (and as practical as possible) examples, and students are gi .ample time to practice techniques using a large number of carefully selected tutorial problems

82. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Initial assessment	Theoretical lectures	General Introduction (Theory) Introduction to Fluid Mechanics Laboratory (Laboratory)	and ٣ ١	٧+ ٤	١
Daily test	Theoretical practical and lectures	Review of the fundamentals of fluid .mechanics and units (Theoretical) Description of .laboratory equipment (My laboratory)	and ٣ ١	٧+ ٤	٢
homework	Theoretical and practical lectures practical laboratory	Fluid properties (mass ,density, weight density relative density, specific ,volume, viscosity compressibility, and .(surface tension (Theoretical) Description of laboratory equipment (laboratory)	and ٣ ١	٧+ ٤	٣
Daily test	Theoretical and practical lectures	Properties of fluids mass density, weight) ,density, relative density ,specific volume ,viscosity compressibility, and .(surface tension (Theoretical) Calibration of a rotary flow meter (laboratory)	and ٣ ١	٧+ ٤	٤
Reports	Theoretical and practical lectures practical laboratory	Newton's equation for the wife. (Theory) Cyclic viscometer calibration (continued) (laboratory)	and ٣ ١	٧+ ٤	٥
Daily test	Theoretical and practical lectures	Principles of fluid statics and the general equation relating to pressure change. (Theoretical)	and ٣ ١	٧+ ٤	٦

		Viscosity determination using a capillary tube viscometer. (Laboratory)			
Reports	Theoretical and practical lectures practical laboratory	Measuring pressure in .static fluids (Theoretical) Viscosity determination using a capillary tube .viscometer (continued) (Laboratory)	and ٣ ١	٧+ ٤	٧
exam	exam	.Midterm exam	and ٣ ١	٦	٨
Daily test	Theoretical and practical lectures	The general concept of forces acting on .submerged bodies (Theoretical) Determining hydrostatic forces. (Laboratory)	and ٣ ١	٧+ ٤	٩
Reports	Theoretical and practical lectures practical laboratory	Forces acting on .submerged flat surfaces (Theoretical) Determining hydrostatic .forces (continued) (Laboratory)	and ٣ ١	٧+ ٤	١٠
Daily test	Theoretical and practical lectures	The general concept of submerged and floating bodies. (Theoretical) Determining the height .of the center of gravity (Laboratory)	and ٣ ١	٧+ ٤	١١
Reports	Theoretical and practical lectures practical laboratory	The general concept of submerged and floating bodies. (Theoretical) Determining metastatic .height (continued) (Laboratory)	and ٣ ١	٧+ ٤	١٢
seminar	Theoretical and practical lectures	Stability of floating and .submerged bodies (Theoretical) Review one week before .the final exam (Practical)	and ٣ ١ and ٧	٧+ ٤	١٣
seminar	Theoretical and practical lectures	Stability of floating and .submerged bodies (Theoretical)	and ٧ , ٣ , ١	٧+ ٤	١٤

	practical laboratory	Review one week before the final exam (continued). (Practical)			
seminar	Theoretical and practical lectures practical laboratory	Review one week before the final exam (theory) Review one week before the final exam (continued) (practical)	and ٧, ٣, ١	٢+ ٤	١٥
exam	exam	.The final exam	and ٣ ١	٦	١٦
83. Course evaluation					
,Assessment details: Formative assessment (٤٠%) including quizzes, homework classroom activities, seminars and projects; midterm exam (١٠%); and final exam .for a total of ١٠٠% of the course grade ,(٪٥٠)					
84. Learning and teaching resources					
Basic Fluid Mechanics by John K. Vinard ; .Robert L. Street, John Wiley & Sons, ١٩٨٢		Required textbooks (methodology, if applicable)			
Fluid Mechanics, by Frank M. White, McGraw- .١ .Hill, ٤th Edition Experiments in Fluid Mechanics (٢٠٠٩), by .٢ .Sarbjit Singh		Main references (sources)			
١		Recommended supporting books and references (scientific journals, reports...)			
https://open.umn.edu/opentextbooks/textbooks?term=fluid+mechanics&commit=Go		Electronic references, websites			

Course description template

84.	name Course : Computer Science ٢
85.	: code The courseUOT031
86.	: Chapter / Year First semester / Level two
87.	date numbers this Description 2026-10-07
88.	Available attendance formats: theoretical laboratory
89.	:Number of study hours (total) / Number of units (total) 3/75
90.	Name of the course coordinator (if there is more than one, please .(mention it Alaa Ahmed Mohamed
91.	Course objectives Using the high-level programming language •MATLAB to develop and implement programs for solving engineering problems Basic programming concepts covered: algorithm design, data types, graphing, numerical methods, flow control, functions, and sorting •Principles of networking, cybersecurity, e-commerce, and computer troubleshooting • •Introduction to artificial intelligence, its applications and tools •
92.	Teaching and learning strategies :This unit will utilize a range of learning and teaching strategies, including •Lectures: To provide students with an overview of the basic concepts and principles – •Laboratories: To provide students with practical experience in using computers and the internet –

Assignments and tests: to give students the opportunity to apply their knowledge and skills to real-world problems and to check their understanding					
93. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
94. Course evaluation					
Short quizzes (10%), online assignments (10%), in-person assignments (0%), lab (10%), midterm exam (10%), final exam (0%)					
95. Learning and teaching resources					
Introduction To MATLAB For Engineering Students, David Houcque, Northwestern University, version 1.2 (2005)			Required textbooks (methodology, if applicable)		
Technology In Action Complete, Alan Evans, Kendall Mar, Mary Anne Poatsy, 16th Edition (2020)			Main references (sources)		
Introduction to Artificial Intelligence (AI), Ahmed Ban, 1st Edition (2024)			Recommended supporting books and references (scientific journals, reports...)		
nothing			Electronic references, websites		

Course description template

96.	: name The course
Engineering surveying	
97.	: code The course
ENVR-ENG-203	
98.	Semester / Year : Annual
First semester / Level two	
99.	date numbers this Description
2026-10-07	
100.	Available attendance formats:
My presence	
101.	:Number of study hours (total) / Number of units (total)
hours, number of units: 4	
102.	Name of the course coordinator (if there is more than one, please .(mention it
1. A.M. Muhammad Hashim Amin 2. M. Saif Saad	
103.	Course objectives
The main objectives achieved upon completion of this course are summarized below: 1. Introducing students to the principles, techniques, and surveying equipment used in engineering projects. 2. Developing skills in accurately measuring distances, angles, and heights, and interpreting survey data to prepare maps and longitudinal and transverse sections. 3. To provide an understanding of mathematical geometry concepts, coordinate systems, cartographic projection methods. 4. Enhancing communication, teamwork, and problem-solving skills necessary for successful engineering surveying applications.	
104.	Teaching and learning strategies

This course aims to provide environmental engineering students with fundamental knowledge in measurement and surveying techniques. The course is generally designed to enable students to understand the theoretical aspects and field procedures by applying appropriate surveying methods to produce maps

105. Course Structure – Theoretical Part					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short / quiz Participation	Lecture + Discussion	Basic concepts space	Understanding the basic concepts, definitions, objectives, and importance of surveying	2	Week 1
duty	Lecture + Problem Solving	measuring distances	Explaining the principles of distance measurement and identifying sources of errors	2	Week 2
Practical assessment	Lecture + Practical Exercises	Measuring with chain and tape	Proper execution of chain and measurement procedures in the field	2	Week 3
Short test	+ Lecture Demonstration	Calibration testing	Applying the necessary calibration correction methods	2	Week 4
duty	Problem-solving session	Measurement correction	Solving practical problems related to measurement corrections using tape chain	2	Week 5
Short test	+ Lecture Demonstration	Settlement principles	Explanation of leveling principles and knowledge of leveling equipment	2	Week 6
practical control	Lecture + Problem Solving	Differential settlement	Applying differential settlement methods and solving HI and RASE problems	2	Week 7

Midterm exam	Written exam	Midterm exam	Assessing understanding of the topics in first half of the course	2	Week ٨
duty	Lecture + Problem Solving	Settlement error	Identifying types of leveling errors applying corrections	2	Week ٩
—	Lecture + practical examples	Advanced contouring leveling	Understanding contouring and advanced leveling techniques	2	Week ١٠
Short test	Lecture + Discussion	Measuring angle	Explanation of the principles of angle measurement and its applications	2	Week ١١
Practical assessment	+ Demonstration	Theodolite Angle Measurement	Operation and explanation of the parts of the theodolite	2	Week ١٢
duty	a lecture	subsurface space	Understanding underground surveying methods	2	Week ١٣
—	Lecture + practical examples	circular curves	Applying the principles of circular curves and methods of signing	2	Week ١٤
Participation	Discussion + Review	Comprehensive review	Review and integrate all space concepts	2	Week ١٥
Final exam	Written exam	Final exam	Demonstrate a general understanding of the course	2	Week ١٦
106. Course structure – practical part					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week

Observation	+ Field demonstration practical training		+ Understanding surveying instrument + Measuring distances with a tape measure Measuring horizontal angles with a theodolite	2	Week 1
Practical assessment + student report	Field training		Identifying and labeling columns using rules 1, 2, and 3	2	Week 2
a report	Field training		Marking a map on the ground using tape	2	Week 3
Observation + Student Report	+ Demonstration Practical Training		Identifying leveling equipment and using tools	2	Week 4
a test	Written + practical		Two-page practical test	2	Week 5
Practical report	Field training		reverse settlement	2	Week 6
a report	Field training		Settlement profile work	2	Week 7
a report	Field training		Leveling cross-sections	2	Week 8
Observation	+ Demonstration Practical Training		Understanding and using the theodolite	2	Week 9
Practical assessment ment	Field training		Measuring horizontal distances	2	Week 10

Practical assessment	Field training		Measuring vertical distances	2	Week ١١
a report	Field training		Signing parallel and vertical lines (theodolite)	2	Week ١٢
Project evaluation	Field project		Surveying of a building using tape theodolite	2	Week ١٣
practical control	Field project		Marking a building on the ground using tape and theodolite	2	Week ١٤
Final exam	practical exam		Final practical exam	2	Week ١٥

107. Course evaluation	
The total course grade (١٠٠ points) is distributed as follows:	
Formative	Assessment (40)
- Quizzes: 20% to be conducted in weeks ٦ and ١٣ – (marks ٢٠) Onsite Activities: 5% throughout the semester – (marks ٥) - Online Assignments: 5% throughout the semester – (marks ٥) - Reports: ١٠% (١٠ marks) – throughout the semester.	
Evaluation	Final (60)
- Midterm Exam: ١٠% (١٠ marks) – Week ١٦. Final Exam: ٥٠% (٥٠ marks) – Week ١٦.	
Total score: ١٠٠ points(100%).	
Assessment is based on short quizzes, field and online activities, reports, midterm exam, and final exam in accordance with the course learning outcomes	

108. Learning and teaching resources	
nothing	Required textbooks (methodology, if applicable)
1. N. N. Basak, Surveying and Leveling, ISBN: 9780074603994. 2. B. C. Punmia , A. K. Jain, and A. K. Jain, Surveying, Vol. I & II*, ISBN: 978-8170088837, 978-8189401238.	Main references (sources)
-	Recommended supporting books and references (scientific journals, reports...)
-	Electronic references, websites

Course description template

109.	name Course : Engineering Ethics
110.	: code The course ENVR-ENG-204
111.	the chapter Year : Annual
First semester / Level two	
112.	date numbers this Description 07-10-2026
113.	Available attendance formats:
	❖) Theoretical lecturesLecture (
	❖) Practical lessons/exercisestutorial (
	❖ Seminars
114.	Total study hours: ٧٥ hours / Total units: ٣ units
115.	Name of the course coordinator (if there is more than one, please mention (it Dr. Abbas Ali Kanoush :Email kanoosh.abbasali@tu.edu.iq
116.	Course objectives
Students will gain a comprehensive understanding of engineering ethics, including its ,fundamental concepts, classifications, rights and responsibilities, codes of ethics	

ethical theories, ethical problem analysis, safety and risk, ethical issues in engineering ethics, workplace ethics, engineering ethics in project management, conflicts of interest and reporting, and intellectual property in engineering ethics. Finally, students .will learn about ethics through case studies and decision-making processes

117. Teaching and learning strategies

) course ENVR-ENG-204) :is based on the following teaching and learning strategies

- Theoretical lectures to introduce the basic concepts in the engineering of ethics
- Practical sessions to introduce participants to the different types of ethics engineering .and their theories
- Practical lessons for solving engineering problems and applying theoretical concepts
- Discussion sessions to develop scientific presentation and discussion skills
- Problem-based learning through the application of ethics engineering principles to .real-world problems
- Classroom discussions and direct interaction to promote understanding and . comprehension of engineering ethics
- Self-learning and homework to develop research and independent thinking skills

118. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
	Lecture and practical	?Why do we study engineering etl	5	3	1
	Lecture and practical applica	Engineer's job	5	3	2
	Lecture and practical applica	Rights and responsibilities	5	3	3
	Lecture and practical applica	Code of Professional Conduct	5	3	4
	Lecture and practical applica	Ethical theories	5	3	5
	Lecture and practical applica	Analysis of ethical problems	5	3	6

	Lecture and practical applica	Safety and risks	5	3	7
	Lecture and practical applica	Integrity and transparency	5	3	8
	Lecture and practical applica	Ethical problems in engineering	5	3	9
	Lecture and practical applica	Environmental ethics in engineeri	5	3	10
	Lecture and practical applica	Ethics in project management	5	3	11
	Lecture and practical applica	,Conflict of interest, whistleblow	5	3	12
	Lecture and practical applica	Intellectual Property and Enginee	5	3	13
	Lecture and practical applica	Case study, problem solving, sem	5	3	14
	Lecture and practical applica	Final exam	1,5,7	3	15

119. Course evaluation

) The assessment for the "Introduction to Engineering Ethics" course ENVR-ENG-204 is based on a continuous and summative assessment system to ensure the (measurement of the targeted learning outcomes. Formative assessment, which includes quizzes, homework, class assignments, seminars, individual or group projects, and laboratory work, constitutes 40% of the final grade. This assessment aims to monitor student progress and continuously reinforce their learning throughout the semester. The midterm exam , which measures students' understanding of the concepts and topics covered during the first half of the semester, constitutes 30% of the final grade. The summative exam, which represents 30% of the final grade, is held at the end of the semester to comprehensively assess the extent to which students .have achieved the course learning outcomes

120. Learning and teaching resources

Engineering Ethics (4th Edition) by Charles Fledderman	Required textbooks (methodology, if applicable)
nothing	Main references (sources)
-Rules and Ethics of Practicing the Engineering Profess by Dr. Nabil Abdul Razzaq Jassim Introduction to Engineering Ethics by Ronald Schnzin and Mike Martin, translated by Dr. Yahya Khalifa	Recommended supporting books and references (scientific journals, reports...)
nothing	Electronic references, websites

Course description template

1. Crimes of the Ba'ath Regime in Iraq : Course Title	
2. : Course codeUOT005	
3. First Semester/Level Two : Semester / Year : Annual	
4. : Date this description was prepared	
2026-10-07	
5. Available attendance forms: In-person in class	
6. : Number of study hours (total) / Number of units (total)	
7. : Name of course coordinator (if there is more than one, please state)	
Abdulrahman Zeidan Ahmed	
8. Course objectives	
	- 1 Identifying the party's crimes and violations He did it during Period of rule. -2 ability on to understand Antiquities Negativity For this The party on side Psychological social and cultural For individuals The people Iraqi. .identification on impact negative on reality the environment Iraqi -3
9. Teaching and learning strategies	
	It was completed situation strategy Learning Education from Okay that He gets student on information Complete

	Cover Curriculum Prepared study For the material And so that It is verified The goal Basic For the curriculum that Install about Imam And you know student crimes And the effects Negativity that He did In it The party on texture the society Iraqi , and review on Violations and violations that I got during a period The ruling from Okay to forbid repetition that The experiment In the future.
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10. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
a test	Lectures	Overview Descriptive on Systems Political in Iraq from ger 2003-1921			Week ١
a test	Lectures	violations order Baathist For rights and freedoms public			Week ٢
a test	Lectures	effect behaviors order Baathist in the society			Week ٣
a test	Lectures	effect Stage transitional in Fighting Politics authoritarianism			Week ٤
a test	Lectures	The field Psychological			Week ٥
a test	Lectures	The field social			Week ٦
a test	Lectures	Religion and State			Week ٧
Midterm exam	exam	Midterm exam			Week ٨

a test	Lectures	Culture, media, and the militarization of society			Week ٩
a test	Lectures	Internationally banned weapons and environmental pollution			Week ١٠
a test	Lectures	scorched earth policy			Week ١١
a test	Lectures	draining the marshes			Week ١٢
a test	Lectures	Mass graves and destruction of places of worship			Week ١٣
a test	Lectures	Real-life examples of the party's crimes From the reality of Iraqi society			Week ١٤
a test	Lectures	Review of the material's contents			Week ١٥
Final exam for the semester	exam	End-of-term exam			Week ١٦

11. Course evaluation

(٢٠) : Short tests
 Yearly work /homework: (١٥)
 Discussions: (٥)
 (١٠) : Midterm exam
 Final exam : (٥٠)

12. Learning and teaching resources

,	Curriculum approved by the Ministry of Higher Education and Scientific Research

Course description template

1. : Course Name Environmental geology	
2. : Course code ENVR-ENGE-205	
3. Term ٢/Level ٢ : Term / Year	
4. Date this description was prepared : 07-10-2026	
5. Available attendance formats:	
In-person lectures	
6. / Total study hours/total units: ٣ hours ٤	
7. Name of the course coordinator (if there is more than one, please .(mention it	
Khaled Ahmed Saleh M M Tamara Louay Rasoul	
8. Course objectives	
	Environmental geology provides geological information understanding the interactions between living organisms Earth, especially humans, and its geological components (rocks and minerals) Soil, rivers, energy resources, morphology, and geological structures (and processes and phenomena). It explains how geological resources play a role in Environmental planning, spatial organization, and regional development are changing our resources It also discusses the effects of geological processes on human existence, including This includes geological hazards and disasters.

9. Teaching and learning strategies					
			The learning and teaching strategy should be designed to: carefully cover essential material and necessary analytical techniques in lectures and demonstrate concepts with ,appropriate (and, where possible practical) examples; and allow sufficient time for students to practice techniques using a large number of .carefully selected learning problems		
10. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
11. Course evaluation					
1 – Daily test number 3 = 18 marks Remote assessment, number 1 = 6 points –2 In-person assessment: 1 = 6 points –3 Project number 1 = 10 marks –4 Midterm exam = 10 marks –5					
12. Learning and teaching resources					
			Required textbooks (methodology, if applicable)		
ACCESS Environmental Geology: An Earth Systems Approach by Dorothy Merritts, Kirsten Menking, Andrew DeWet, 2018. 2nd ^{Edition} . Environmental Geology by James S. Reichard, 2001 published by McGraw-Hill.			Main references (sources)		

"Environmental Geology: Geology And The Human Environment" by Bennett MR, 2016. "Environmental Geology: Ecology, Resource and Hazard Management" by KS Valdiya , 2002. Introduction to Environmental Geology by Edward Keller, 2012, 5th ^{ed} .	
	Recommended supporting books and references (scientific journals, reports...)
	Electronic references, websites

Course description template

13.	: name The course
	Water supply engineering
14.	: code The course
	ENVR-ENG-206
15.	: Chapter / Year
	Chapter Two / Level Two
16.	: date numbers this Description
	2026-10-07
17.	Available attendance formats:
	My presence
18.	:Number of study hours (total) / Number of units (total)
	/hours ١٥٠ 6 ECTS
19.	Name of the course coordinator (if there is more than one, please state)
	: Dr. Nadia Nuzhat Subaih
20.	Course objectives
	Upon completion of this material, students will be able to: 1- – Understanding the basic concepts of water consumption. 2- Learn how to predict population size. 3- Learn how to design conventional water treatment plant units. – ٤ Understanding the key concepts of the processes that take place in the units of a water treatment plant.

	Determining the quality of water samples by comparing them to standard specifications based on –o conducting experiments				
21. Teaching and learning strategies					
	The learning and teaching strategy is designed to: thoroughly cover essential core material and analytical techniques in lectures and laboratories, and clarify concepts and design criteria with .appropriate examples, allowing students ample time to practice designing water treatment units				
22. Course Structure / Theoretical Material					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
world problem-based learning . approach	Giving lectures inside the hall and taking notes during the lectures	per capita water consumption	the basic understand concepts of water consumption.	٦	– First Second
Short daily ,quizzes homework ,assignments and the use of a real-world problem-based learning . approach	Giving lectures inside the hall and taking notes during the lectures	Population forecast	Learn how to predict population size.	٣	the third
Short daily ,quizzes homework ,assignments and the use of a real-world problem-based learning . approach	Giving lectures inside the hall and taking notes during the lectures	Common impurities in water	The ability to identify the most common impurities in water	١٢	–Fourth Seventh

Short daily ,quizzes homework ,assignments and the use of a real-world problem-based learning . approach	Giving lectures inside the hall and taking notes during the lectures	Design of a conventional w	Learn the basic concepts of how to design conventional water treatment plant units.	٢٤	Eighth– Fifteenth
Laboratory reports for each experiment	Conducting laboratory experiments	Various laboratory experiments were selected to achieve the .goal	Determining the quality of water samples by comparing them to standard specifications based on experimental .procedures	30	First_Fiftee nth Laborator) y/Practical (Part
23. Course evaluation					
) Midterm exam (١٠٪), final exam (٥٠٪), ٢ quizzes16) homework assignments ٢ ,(%4 reports ,(% .and project (١٠٪) , (١٠٪)					
24. Learning and teaching resources					
Water Supply and Sewerage. Sixth ed. , by E. W. Steel and Terence J. Mc Ghee, 1991. Publisher McGraw-Hill, Inc.		Required textbooks (methodology, if applicable)			
Water Supply and Sewerage. Fifth ed. , by Terence J. Mc Ghee, 1979. Publisher McGraw-Hill, Inc.		Main references (sources)			
-----		Recommended supporting books and references (...scientific journals, reports)			
-----		Electronic references, websites			

Course description template

85.	Flow Course Name : Fluid
86.	:Course code ENVR-ENG-207
87.	Second Term/Level Two : Term/Year: Annual
88.	: Date this description was prepared 2026-10-07
89.	Available attendance formats: + Theoretical lectures + Practical application Practical laboratory
90.	:Total study hours/total units ECTS 6/150
91.	Name of the course coordinator (if there is more than one, please list them). Dr. Ahmed Saadi Mahmoud
92.	Course objectives
	The aim of this course is to help meet the need to gather information related to the principle of f .flow
93.	Teaching and learning strategies
	The learning and teaching strategy is designed to: carefully cover the essential material and analytical techniques needed in lectures, illustrate concepts with appropriate (and as practical as possible) examples, and allow sufficient time for students to practice techniques using a large number of carefully .selected lesson problems
94.	Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Initial assessment	Theoretical lectures	General introduction to fluid flow through channels (theoretical) Introduction to Fluid Mechanics Laboratory (Practical)	and ٣ ١	٧+ ٤	١
Daily test	Theoretical practical and lectures	Classifying flow ,according to time ,distance, acting forces .and direction (Theoretical) Calibrating an ammeter .(practical experiment) (Laboratory)	and ٣ ١	٧+ ٤	٢
homework	Theoretical and practical lectures practical laboratory	The fundamental equations of fluid motion (the law of .(conservation of mass (Theoretical) Calibrating an ammeter .(continued) (Laboratory)	and ٣ ١	٧+ ٤	٣
Daily test	Theoretical and practical lectures	The fundamental equations of fluid motion (the law of conservation of .(momentum (Theoretical) Bernoulli's equation experiment. (Laboratory)	and ٣ ١	٧+ ٤	٤
Reports	Theoretical and practical lectures practical laboratory	The fundamental equations of fluid motion (the law of .(conservation of energy (Theoretical) Bernoulli's equation experiment. (Continued) (Laboratory)	and ٣ ١	٧+ ٤	٥
Daily test	Theoretical and practical lectures	Applications of Bernoulli's equation (theorem)	and ٣ ١	٧+ ٤	٦

		Effect of the inhalation experiment (laboratory)			
exam	exam	.Midterm exam	and ٣ ١	٧+ ٤	٧
Reports	Theoretical and practical lectures practical laboratory	The energy equation in real fluid flow. (Theory) The effect of the puffing experiment. (Continued) (Laboratory)	and ٣ ١	٦	٨
Daily test	Theoretical and practical lectures	Loss of flow and friction in pipes (theoretical) Calibrating the Venturi scale (practical experiment)	and ٣ ١	٧+ ٤	٩
Reports	Theoretical and practical lectures practical laboratory	Types of fluid flow ,problems in pipes ,including pressure loss flow rate, and .volumetric issues (Theoretical) Calibrating a Venturi .meter (experiment) .(continued). (laboratory)	and ٣ ١	٧+ ٤	١٠
Daily test	Theoretical and practical lectures	Flow through branching pipes, including series and parallel pipe systems. (Theoretical) .Reynolds' experiment (Laboratory)	and ٣ ١	٧+ ٤	١١
Reports	Theoretical and practical lectures practical laboratory	The general concept of interconnected multi- .tank systems (Theoretical) .Reynolds' experiment .(Continued) (Laboratory)	and ٣ ١	٧+ ٤	١٢
Daily test	Theoretical and practical lectures	Pumps and turbines (theory) Determining the coefficient of friction (practical experiment) (laboratory)	and ٣ ١ and ٧	٧+ ٤	١٣
Reports	Theoretical and practical lectures	Introduction to open channel flow (channel	and ٧ ,٣ ,١	٧+ ٤	١٤

	practical laboratory	geometry and Manning's equation). (Theoretical) Determining the coefficient of friction (experiment) (continued). (laboratory)			
seminar	Theoretical and practical lectures practical laboratory	Review one week before the final exam (theory) Review one week before the final exam (continued) (practical)	and ٧ , ٣ , ١	٢ + ٤	١٥
exam	exam	.The final exam	and ٣ ١	٦	١٦

95. Course evaluation

,Assessment details: Formative assessment (٤٠٪) including quizzes, homework classroom activities, seminars and projects; midterm exam (١٠٪); and final exam .for a total of ١٠٠٪ of the course grade ,(٪٥٠)

96. Learning and teaching resources

Basic Fluid Mechanics by John K. Vinard .Robert L. Street, John Wiley & Sons, ١٩٨٢	Required textbooks (methodology, if applicable)
Fluid Mechanics, by Frank M. White, McGraw- . ١ .Hill, ٤th Edition Experiments in Fluid Mechanics (٢٠٠٩), by .٢ .Sarbjit Singh	Main references (sources)
١	Recommended supporting books and references (scientific journals, reports...)
https://open.umn.edu/opentextbooks/textbooks?term=fluid+mechanics&commit=Go	Electronic references, websites

Course description template

1.	name Course : Environmental Microbiology
2.	: code The course ENVR-ENG-208
3.	Chapter Two / Level Two :Semester / Year : Annual
4.	date numbers this Description 07-10-2026
5.	Available attendance formats: ✓ Theoreticallectures ✓) Practical Lessons/ExercisesTutorial Lab Work / (✓ Seminars
6.	Total study hours: ١٥٠ hours / Total units: ٦ units
7.	.Name of the course coordinator (if there is more than one, please mention it) Dr. Abbas Ali Kanoush
8.	Course objectives Understanding the role of important microorganisms in environmental processes and .١ .applications

Employing the principles of microbiology and biochemistry to understand, describe, and .۲
 .predict biological engineering and natural processes
 .Developing knowledge and analytical skills related to environmental microbiology .۳

9. Teaching and learning strategies

) The Environmental Microbiology course ENVR-ENG-208 adopts the following teaching (:and learning strategies

- Theoretical lectures to introduce the basic concepts in microbiology
- Practical sessions to introduce participants to different types of microorganisms and laboratory work methods
- Practical lessons for solving engineering problems and applying theoretical concepts
- Discussion sessions to develop scientific presentation and discussion skills
- Problem-based learning through the application of chemical engineering principles to real-world problems
- Classroom discussions and direct interaction to promote understanding and comprehension
- Self-learning and homework to develop research and independent thinking skills

10. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short	Lecture and practical application with exercises	Microorganisms and Microbiology	3	5	1
homew	Lecture and practical application with exercises	microbial communities	3	5	2

homew	Lecture and practical applica with exercises	Chemistry and Biochemistry	3	5	3
Short	Lecture and practical applica with exercises	Cell structure and function	3	5	4
homew	Lecture and practical applica with exercises	microbial metabolism	3	5	5
Short	Lecture and practical applica with exercises	microbial growth	3	5	6
Short	Lecture and practical applica with exercises	Microbial Evolution and Classification, Midte Exam	3	5	7
homew	Lecture and practical applica with exercises	Bacteria: Proteobacteria, Gram-positive bacteria, other types of bacteria	3	5	8
exam	Lecture and practical applica with exercises	Eukaryotic cells	3	5	9
Solving	Lecture and practical applica with exercises	Metabolic diversity	3	5	10
Short	Lecture and practical applica with exercises	Destruction of microbes	3	5	11
homew	Lecture and practical applica with exercises	Microbial ecosystems and molecular microbiology	3	5	12
homew	Lecture and practical applica with exercises	Nutrient courses, bioprocessing, and micro ecology methods	3	5	13
Solving	Lecture and practical applica with exercises	Problem Solving + Seminar	3	5	14
Final	exam	Final exam	1,3,7	5	15

11. Course evaluation

12.) The assessment for the Introduction to Environmental Microbiology ENVR-ENG-208 course is based on a continuous and summative assessment system to ensure the (measurement of the targeted learning outcomes. Formative assessment, which includes quizzes, homework, class assignments, seminars, individual or group projects, and laboratory work, constitutes 40% of the final grade. This assessment aims to monitor student progress and continuously reinforce their learning throughout the semester. The midterm exam, which measures students' understanding of the concepts and topics covered during the first half of the semester, constitutes 30% of the final grade. The summative exam, which represents 30% of the final grade, is held at the end of the semester to comprehensively assess the extent .to which students have achieved the course learning outcomes

13. Learning and teaching resources	
Brock Biology of Microorganisms, M. T. Madigan, J. M. Martin and D. Clark. 2009. Prentice Hall, NJ, 12th Edition or above	Required textbooks (methodology) (if applicable)
nothing	Main references (sources)
Environmental Biology for Engineers and Scientists David A. Vaccari, Peter F. Strom, James E. Alleman, John Wiley Sons, Inc, 2006	Recommended supporting books and references (...scientific journals, reports)
nothing	Electronic references, websites

Course description template

14.	: name The course
	Air quality engineering
15.	: code The course
	ENVR-ENG-209
16.	Semester / Year : Annual
	Chapter Two / Level Two
17.	date numbers this Description
	2026-10-07
18.	Available attendance formats:
	In-person classes
19.	:Number of study hours (total) / Number of units (total)
	hours / ٤ units 48
20.	Name of the course coordinator (if there is more than one, please .(mention it
	M.M. Osama Hassan Ali Email: osama.h.ali@tu.edu.iq
21.	Course objectives
	,Introducing students to the basic concepts of air pollution , including the types of pollutants – ١ their sources, and their environmental and health effects. Developing students’ understanding of the weather factors affecting the spread of air – ٢ pollutants , along with learning about air quality monitoring and evaluation techniques. Enabling students to analyze and evaluate air pollution control techniques and understand air – ٣ quality standards and regulations. , Encouraging students to explore sustainable solutions to improve air quality in urban areas – ٤ . including green infrastructure, smart city initiatives, and clean transportation

22. Teaching and learning strategies					
Delivering theoretical lectures to explain the fundamental concepts and principles related to air pollution and air quality. Organizing interactive discussions to foster critical thinking and the exchange of opinions on air pollution issues and contemporary environmental challenges. Utilizing demonstrations and visual aids to explain the mechanisms of pollutant dispersal and air quality monitoring and control techniques. Employing real Air Quality Index (AQI) data in the analysis, interpretation, and practical application of theoretical concepts, thereby enhancing students' skills in assessing air quality and making appropriate environmental decisions					
23. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
24. Course evaluation					
Quizzes 16 %, Online Assignments 14 % Project 5 %, Seminar 5 %, Midterm exams 10% and final exam 50%					
25. Learning and teaching resources					
Air Pollution by MN Rao and HVN Rao . 1 st Edition Publisher Tata McGraw-Hill 9780074518717			Required textbooks (methodology, if applicable)		
			Main references (sources)		
			Recommended supporting books and references (scientific journals, reports...)		
			Electronic references, websites		

Course description template

1. Course Title : Arabic Language for Non-Specialization Departments	
2. : Course code UOT011	
3. Second Term/Level Two : Term / Year : Annual	
4. : Date this description was prepared	
2026-10-07	
5. Available attendance forms: In-person in class	
6. Total study hours / Total units : ٥٠ / ٣ ECTS	
7. : Name of course coordinator (if there is more than one, please state)	
Abdulrahman Zeidan Ahmed	
8. Course objectives	
	Developing language skills, memorizing some Quranic -١ chapters, and enhancing students' love for the language Understanding how to apply grammatical rules in everyday life, and -٢ .knowing linguistic terminology in the fields of engineering and science The importance of the Arabic language in areas of daily life -٣ Using grammatical rules correctly in writing scientific reports and -٤ .research Promoting self-learning and independence in learning and encouraging students to .take the initiative in learning the Arabic language
9. Teaching and learning strategies	

	The teaching strategy is an educational method that relies on reorganizing and adapting information in a way that enables access to new information. This strategy is characterized by making the student active and positive, and our role is that of a guide, mentor, and planner. This enables the student to discover knowledge smoothly				
10. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
a test	Lectures	Surah Al-Isra, verses ٢٣-٢٩ / Surah Yusuf, verses ٧-١٩			Week ١
a test	Lectures	A noble prophetic hadith			Week ٢
a test	Lectures	Verses from the poem of Al-Sharif Al-Radi / Mutanabbi's Mimiyyah			Week ٣
a test	Lectures	Verses by Al-Jawahiri (Peace be upon the tower) (palm trees) Al-Sayyab (The Rain Song)			Week ٤
a test	Lectures	Common linguistic errors			Week ٥
a test	Lectures	Rules for writing the open and closed taa' / Rules for numbers and counted nouns			Week ٦
Midterm exam	exam	Midterm exam			Week ٧
a test	Lectures	Rules for writing the / ظ and ض Writing the letter long and short alif			Week ٨
a test	Lectures	Stages of language collection / My school curriculum: Al-Maqayis and Al-Sahah			Week ٩
a test	Lectures	Common linguistic errors			Week ١٠

a test	Lectures	Noun conjugation (nouns in terms (masculine and feminine genders The subjunctive and jussive moods of present tense verb			Week ١١
a test	Lectures	The science of rhetoric and its impact on eloquence of speech			Week ١٢
a test	Lectures	,Semantic embellishments (pun, antithesis (contrast Good reasoning, emphasizing praise .means of something resembling blame			Week ١٣
a test	Lectures	,Verbal embellishments (alliteration, rhyme (quotation, allusion			Week ١٤
a test	Lectures	Review of the material's contents			Week ١٥
End-of-term exam	exam	End-of-term exam			Week ١٦

11. Course evaluation

(٢٠) : Short tests
 Yearly work /homework: (١٥)
 Discussions: (٥)
 (١٠) : Midterm exam
 Final exam : (٥٠)

12. Learning and teaching resources

,	Curriculum approved by the Ministry of Higher Education and Scientific Research

Course description template

1. Course Name : English ٢	
2. UOT-021	
3. Term / Year : Level Two/Semester Two	
4. Date this description was prepared : .٧-١٠-٢٠٢٦	
5. Available attendance formats: Theoretical lectures	
6. / Total study hours/total units: ٥٠2 ECTS	
7. .The name of the course coordinator is Dr. Ahmed Khalil Ibrahim	
8. Course objectives	
	Understanding and using tenses, such as the simple present, the present continuous, the simple past, and .simple future, correctly in speaking and writing ,Constructing correct sentences. Learn to form positive negative, and interrogative sentences using the auxiliary words do/does/did/will .and the correct word order (Developing specialized vocabulary in the field of environmental engineering. Acquiring vocabulary rela

	to hospitals, medical departments, medical staff, medical equipment for use in academic and professional contexts Understanding the rules of definite and indefinite articles. Distinguishing between a/an/the and using them accurately in English sentences Developing reading comprehension skills. Improving the ability to read scientific and medical texts, answer comprehension questions, and extract essential information from them
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9. Teaching and learning strategies

The English language course(UOT-021) adopts the following teaching and learning strategies:

'Theoretical lectures, seminars, classroom discussions, and experiential dialogues to develop students' language skills

10. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	a lecture	learn how to make applications and write recruitment procedures must gone through in the process	1	2	١
duty	a lecture	acquire the special terminology used in job applications recruitment procedures	1	2	٢
Short test	a lecture	Learn how to design application letter and CV	1	2	٣
duty	a lecture	Have a clear idea about how to prepare for an interview and how to behave during an interview	1	2	٤

Short test	a lecture	become familiar with methods of writing a “letter of intent” (“statement of purpose”) when applied for academic studies	1	2	٥
duty	a lecture	have an idea about the “letter of recommendation” that will be needed when applying for an academic program and completing university education	1	2	٦
Short test	a lecture	Midterm exam	1	2	٧
duty	a lecture	gain an understanding of presentation techniques	1	2	٨
Short test	a lecture	gain an understanding of presentation techniques	1	2	٩
duty	a lecture	become familiar with the basic principles of “Paragraph Writing”	1	2	١٠
Short test	a lecture	become familiar with the basic principles of “Paragraph Writing”	1	2	١١
duty	a lecture	learn and practice the concepts of paragraph writing such as Topic Sentence, Supporting Sentence, Concluding Sentence, Unity and Coherence	1	2	١٢
Short test	a lecture	learn and practice the concepts of paragraph writing such as Topic Sentence, Supporting Sentence, Concluding Sentence, Unity and Coherence	1	2	١٣
duty	a lecture	gain insight into the essential principles of “Essay Writing”	1	2	١٤

Short test	a lecture	gain insight into the essential principles of “Essay Writing”	1	2	10
11. Course evaluation					
marks for the quiz, 10 marks for homework, 10 marks for classwork, 10 marks for the 10 assignment, and 10 marks for the midterm exam					
12. Learning and teaching resources					
Beer, D. & McMurrey, D. 2004, A Guide to Writing as Engineer (2nd ed), New York: Wiley			Required textbooks (methodology, if applicable)		
Borowick, Jerome N., 2002, Technical Communication and Applications (2nd ed), New Jersey: Prentice-Hall, Inc.			Main references (sources)		
			Recommended supporting books and references (scientific journals, reports...)		
http://umich.edu/~elements/5e/lectures/index.html			Electronic references, websites		

Course description template

1.	: Course Name
	numerical analysis
2.	: Course code
	MATH-301
3.	Semester / Year : Annual
	Chapter ١ / Level ٢
4.	Date this description was prepared
	2026-10-07
5.	Available attendance formats:
	Theoretical lectures Practical Lessons/Exercises(Tutorial)
6.	:Number of study hours (total) / Number of units (total)
	100
7.	Name of the course coordinator (if there is more than one, please (mention it
	Dr. Hassan Ali Ahmed
8.	Course objectives
	This course provides an introduction and details about the numerical methods used, comparing their .mathematical solutions and their use in solving engineering problems
9.	Teaching and learning strategies
	Defining the concepts of different numerical methods, the differences between them, and their .characteristics of each .Applying the concepts of numerical methods –٢

	.Understanding the importance of numerical methods in practical life –۳ .Developing the student's understanding of numerical methods –۴ .Trying to come up with new numerical concepts –۵				
10. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Lecture	Numerical methods (introduction)	1	3	1
	exercises		1	3	2
duty	Lecture	Numerical solution to differential equation	1	3	3
	exercises		1	3	4
Short test	Lecture	Matrices and their applications	1	3	5
	exercises		1	3	6
exam	Lecture	Matrices and their applications	1	3	7
	exercises		1	3	8
Short test	Lecture	Linear interpolation	1	3	9
	exercises		1	3	10
duty	Lecture	Curve approximation	1	3	11
	exercises		1	3	12
Short test	Lecture	numerical integration	1	3	13
	exercises		1	3	14
exam	Lecture	Midterm exam	1	3	15
	exercises		1	3	15
	Lecture	Applying the solution to differential equation			
	exercises				
	Lecture	Applying the solution to differential equation			
	exercises				
	Lecture	Fourier series			
	exercises				
	Lecture	Fourier series			
	exercises				
	Lecture				
	exercises				
	Lecture				
	exercises				
	Lecture				
	exercises				

	final exam				
11. Course evaluation					
,Quizzes: 10%, Online assignments: 3, 10%, Homework: 0, 0%, Assignments: 1, 10%. Seminars: 1, 10%, Midterm Final Exam: 1, 00%					
12. Learning and teaching resources					
C. Ray Wylie, "Advanced engineering mathematics" McGRAW- Hill , INC , L fourth edition, 1975		Required textbooks (methodology, if applicable)			
		Main references (sources)			
		Recommended supporting books and references (scientific journals, reports...)			
		Electronic references, websites			

Course description template

13.	Wastewater principles : name The course
14.	: code The course ENVR-ENG-301
15.	First Term/Level Three : Term / Year
16.	date numbers this Description: 07-10-2026
17.	Available attendance methods: In-person attendance within the classroom
18.	Total study hours/total units: ١٥٠ hours/٦ units
19.	Name of the course coordinator (if there is more than one, please .(mention it
Dr. Masoud Mohsen Hazza	
20.	Course objectives
	- Understanding the types and characteristics .wastewater and how to deal with them - .Explaining the concept of wastewater treatment - Providing information on wastewater treatm .methods

	- .Explanation of the initial treatment - .Explanation of the initial treatment - .Determining reaction rates - .Explanation of design standards Studying some laboratory experiments -
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21. Teaching and learning strategies

	The learning and teaching strategy is designed to achieve the following: comprehensive coverage of the essential material and analytical techniques required in lectures, illustrations of concepts with appropriate (and practical, whenever possible) examples, and allow sufficient time for students to practice techniques using a large number of carefully selected .practice problems
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22. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Lecture : exercises	The concept of wastewater and its treatment Practical: Experiment determine biological oxygen demand	1	6	1
duty	Lecture : exercises	Types of wastewater Practical: Experiment determine biological demand (continued)	1	6	2
duty	Lecture : exercises	Treatment methods Practical: Experiment determine the chemical demand for oxygen	1	6	3
Short test	Lecture : exercises	Processing systems Practical: Experiment identify pollutants using ultraviolet spectroscopy	1	6	4
duty	Lecture : exercises	Basic design considerations	1	6	5

		Practical: Experiment identify pollutants using photogrammetry flame			
Short test	Lecture exercises	flow rate Practical: Identify pollutants using atomic absorption		6	
duty	Lecture exercises	Design standards Practical: Identify pollutants using HPLC		7	
exam	exam	Midterm exam Practical: Identify functional groups		8	
Solving problems	Lecture exercises	General procedure for des calculation Practical: Identify pollutants using gas chromatography		9	
Short test	Lecture exercises	Hydraulic flow diagram Practical: The molecu formula of the unknown compound		10	
duty	Lecture exercises	Reactions and reactors Practical: Characterization solid surfaces using scanning electron microscopy		11	
duty	Lecture exercises	The concept of interaction Practical: Keldale nitrog estimation		12	
Solving problems	Lecture exercises	The concept of reactors Practical: Determining sludge volume index		13	

Project + Present ation	Problem + Solv Seminar	Design of primary process units Practical: Determining area required for sludge thickening			14
Solvin g proble ms	a lecture	Collection basin and pump well Practical: Identifying oil and grease			15

23. Course evaluation

The assessment for the Introduction to Environmental Engineering course is based on the principle of continuous and summative assessment to ensure the measurement of the achievement of the targeted learning outcomes. Formative assessment, which includes quizzes, homework, class assignments, seminars, and individual or group projects, accounts for 40% of the total grade. This assessment aims to monitor student progress and continuously enhance their learning throughout the semester. A midterm exam, which measures students' understanding of the concepts and topics covered during the first half of the semester, accounts for 30% of the grade. The final exam, which represents 30% of the total grade, is held at the end of the semester to comprehensively assess students' achievement of the course learning outcomes.

24. Learning and teaching resources

Wastewater treatment and reuse, Metcalf & Eddy, Fourth Edition, 2014	Required textbooks (methodology, if applicable)
	Main references (sources)
Wastewater Treatment Concept and design	Recommended supporting books and references (scientific journals, reports...)
	Electronic references, websites

Course description template

25.	: Course Name Solid waste management
26.	: Course codeENVR-ENG-302
27.	First Term/Level Three : Term / Year
28.	Date this description was prepared : 07-10-2026
29.	Available attendance methods: In-person attendance within the classroom
30.	:Total study hours/total units4/ hours °
31.	Name of the course coordinator (if there is more than one, please .(mention it
Khaled Ahmed Saleh	
32.	Course objectives
	Identifying the types of solid waste to manage in .engineering patterns Providing expertise in analyzing pollution problems -٢

	To preserve environmental resources using appropriate processes For waste management, for example, ٤Rs. ,To identify the important methods for collection, storage, processing and disposal ,Providing the design of collection routes, sanitary landfill and incinerators				
33. Teaching and learning strategies					
	The learning and teaching strategy should be designed to: carefully cover essential material and necessary analytical techniques in lectures and demonstrate concepts with ,appropriate (and, where possible practical) examples; and allow sufficient time for students to practice techniques using a large number of .carefully selected learning problems				
34. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
35. Course evaluation					
1 – Daily test number ٣ = ١٨ marks Remote assessment, number ١ = ٦ points –٢ In-person assessment: ١ = ٦ points –٣ Project number ١ = ١٠ marks –٤ Midterm exam = ١٠ marks –٥					
36. Learning and teaching resources					

Integrated Solid Waste Management's. Tchobanoglous Mc-Grow Hill 1993	Required textbooks (methodology, if applicable)
Integrated Solid Waste Management's. Tchobanoglous Mc-Grow Hill 1993	Main references (sources)
	Recommended supporting books and references (scientific journals, reports...)
	Electronic references, websites

Course description template

37. name Course : Hydraulics of treatment plants	
38. : code The course ENVR-ENG-303	
39. Term / Year : First Term/ Level Three	
40. date numbers this Description 07-10-2026	
41. Available attendance formats: Theoretical lectures and practical lessons/exercises seminars	
42. :Number of study hours (total) / Number of units (total)	
125 hr. / 5 ECTS Credits	
43. Name of the course coordinator (if there is more than one, please .(mention it	
Dr. Ahmed Yasser Radif	Dr. Wissam Samir Mohammed Ali
44. Course objectives	

Studying the design and hydraulic analysis of water treatment plants according to modern programs and laws through the application of mathematical laws and approved design methods

- The student learns about the most important methods of analysis and design used
- The student learns about the hydraulic design of treatment plants and their various parts
- To give the student experience in choosing the appropriate method for designing those stations based on the available data

45. Teaching and learning strategies

Hydraulics of Treatment Plants course(ENVR-ENG-303) adopts the following teaching and learning strategies:

- Theoretical lectures to present the basic concepts of how treatment plants work and the principles.
- Practical lessons(tutorials) for solving engineering problems and applying theoretical concepts.
- Seminars for developing scientific presentation and discussion skills.
- Problem-based learning through the application of engineering principles to real-world problems.
- Classroom discussions and direct interaction to enhance understanding and comprehension
- Self-learning and homework to develop research and independent thinking skills

46. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Lecture and exercises	Introduction to Station Hydraulics	2	3	1
duty	Lecture and exercises	Review of flow in pipes in parallel and sequential cases	2	3	2
Solving problems	Lecture and exercises	Introduction to Pump Characteristics	2	3	3

Short test	Lecture and exercises	Characteristics of sequential and parallel connection of pumps	2	3	4
duty	Lecture and exercises	Characteristics of flow in channels and free flow	2	3	5
duty	Lecture and exercises	Critical flow and water energy	2	3	6
Solving problems	Lecture and exercises	Discharge measurements at stations	2	3	7
Midterm exam	exam	Midterm exam	2	3	8
Short test	Lecture and exercises	Calculating and controlling discharge using weirs	2	3	9
duty	Lecture and exercises	Calculating and controlling drainage using a Parshall channel and a Venguerre meter	2	3	10
Solving problems	Lecture and exercises	Analysis of hydraulic distribution within stations	2	3	11
Short test	Lecture and exercises	Hydraulic distribution design within stations	2	3	12
panel discussion	Lecture and exercises	Integrated flow design at stations	2	3	13
panel discussion	Lecture and exercises	Integrated flow design at stations	2	3	14
final exam	exam	final exam	2	3	15
47. Course evaluation					
marks for quizzes, 10 marks for the discussion forum, 10 marks for assignments, 10 marks for 10 problem-solving interaction, 10 marks for the midterm exam, and 20 marks for the final exam					

48. Learning and teaching resources	
Treatment Plant Hydraulics for Environmental, Benefield . 2015	Required textbooks (methodology, if applicable)
Water and Wastewater by Shun Dar Lin	Main references (sources)
<u>Treatment plant hydraulics for environmental engineers (1984 edition) OpenLibrary</u>	Recommended supporting books and references (scientific journals, reports...)
	Electronic references, websites

Course description template

49.	: name The course
Water quality engineering	
50.	: code The course
ENVR-ENG-304	
51.	Semester / Year : Annual
Chapter ١ / Level ٢	
52.	date numbers this Description
2026-10-07	
53.	Available attendance formats:
My presence	
54.	:Number of study hours (total) / Number of units (total)
/ hours 1506 ECTS	
55.	Name of the course coordinator (if there is more than one, please .(mention it
Dr. Nadia Nuzhat Subaih	
56.	Course objectives
	Upon completion of all lectures for the course, the student will be able :to

	1- Establishing the engineering foundation through the classification of stress factors and the determination of the amount of organic pollution(BOD/COD) and the kinetics of microbial decomposition 2- Modeling the transport and fate of pollutants in aquatic systems using mathematical models derived from the theory of hydraulic reactors for rivers and lakes. 3- Designing effective recovery strategies , including managing eutrophication. Development and application of clean technologies 4- The regulatory policy is applied to ensure the protection of aquatic ecosystems and compliance with national standards, such as the Canadian Water Quality Guidelines.				
57. Teaching and learning strategies					
	The learning and teaching strategy was designed to achieve the following : The lectures should cover the essential material and necessary analytical techniques, clarify concepts with appropriate and practical examples (where possible), and allow sufficient time for students to practice these techniques using a large number of carefully selected tutorial problems .				
58. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short ,quizzes homework assignments ,midterm ,exam real-	Classroom lectures and notes	Framework and policy for water ,quality management determination of the quantity of organic pollution, and oxygen dynamics.	Establishing the engineering foundation through the classification of stress factors and the determination of the amount of organic pollution (BOD/COD) and the kinetics of microbial decomposition	18	1-6

world problem-based .learning					
Short ,quizzes homework ,assignments learning based on real-world .problems	Classroom ,lectures notes, and problem-solving exercises related to the subject .matter	Mathematical modeling of the fate and transport of pollutants.	Modeling the transport and fate of pollutants in aquatic systems using mathematical models derived from the theory of hydraulic reactors for rivers and lakes.	6	7-8
Classroom m assignme ,nts learning based on the existence of a real-world .problem	Classroom ,lectures notes, and problem-solving exercises related to the subject .matter	Restoration and management of eutrophication in aquatic systems.	Designing effective recovery , strategies including managing eutrophication. Development and application of clean technologies	9	9-11
Classroom m assignme ,nts learning based on	Classroom ,lectures ,notes problem-solving related to the subject matter, and watching short	Protecting aquatic ecosystems and regulatory guidelines	5- The regulatory policy is applied to ensure the protection of aquatic ecosystems and compliance with ,national standards such as the	12	12-15

the existence of a real- world problem	educational science films		Canadian Water Quality Guidelines.		
59. Course evaluation					
Midterm exam (10%), final exam (20%), 3 quizzes (10%), 3 homework assignments (10%), 3 class assignments (10%), and a project (10%)					
60. Learning and teaching resources					
Engineering Management of Water Quality Hardcover – January 1, 1968 by McCaughey, P. H		Required textbooks (methodology, if applicable)			
Water quality monitoring: a practical guide to the design and implementation of freshwater quality studies and monitoring programmes. Bartram, J., & Ballance, R. (Eds.). (1996). - Water Quality Engineering in Natural Systems, Wiley Interscience, 2006, David A. Chin		Main references (sources)			
-----		Recommended supporting books and references (scientific journals, reports...)			
-----		Electronic references, websites			

Course description template

61.	: Course Name			
heat transfer				
62.	: Course code			
ENVR-ENG-305				
63.	Semester / Year : Annual			
Chapter ١ / Level ٣				
64.	Date this description was prepared			
2026-10-07				
65.	Available attendance formats:			
• In-person lectures • Practical lessons (solving problems)				
66.	:Number of study hours (total) / Number of units (total)			
• Total course load : ١٠٠ hours/semester • Weekly hours : ٣ hours • Number of units(ECTS): 4				
67.	Name of the course coordinator (if there is more than one, please .(mention it			
Name:	Dr.	Ahmed	Yasser	Rade
Academic		Title:		Lectu
Academic		Qualification:		P

Department: Environmental Engineering – Tikrit University		College: Engineering – Tikrit University		Email: ahmed.y.radeef@tu.edu.iq	
68. Course objectives					
			• Introducing students to the basic concepts of heat transfer and its types. • Enabling students to understand and calculate heat transfer by conduction and convection. • Explaining the difference between heat transfer rate and heat flux. • Studying the principles of thermal radiation and blackbody. • Understanding the basic principles of heat exchanger design and their engineering applications. • Linking heat transfer concepts to environmental applications and environmental engineering.		
69. Teaching and learning strategies					
			• Interactive lecture to explain theoretical concepts. • Solving practical problems within the classroom. • Assigning students numerical and analytical tasks. • Presenting scientific seminars on environmental applications of heat transfer. • A small-scale project on the design of a heat exchanger or the analysis of an environmental thermal system.		
70. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week

Short test	a lecture	Introduction and classification of heat transfer	Understanding heat transfer concepts	3	1
duty	Lecture + Problem	Thermal conductivity – dimension	Distinguishing between transition patterns	3	2
a test	Applied problem	Stable delivery	Solving connection problems	3	3
duty	a lecture	Multi-dimensional connection	Multidimensional conductivity analysis	3	4
Short test	a lecture	Unstable delivery	Understanding unstable conduction	3	5
duty	a lecture	Principles of convection	Understanding convection	3	6
Mid-year exam	Issues	Forced convection	Forced convection related application	3	7
oral assessment	a lecture	normal convection	Understanding normal convection	3	8
duty	Issues	Practical applications	Convection systems analysis	3	9
a test	a lecture	radiation and black body	Understanding thermal radiation	3	10
duty	Issues	radiation laws	Calculating radiation transmission	3	11
project	a lecture	Types of heat exchangers	Understanding exchangers	3	12
Project evaluation	Issues	Exchanger design	Exchanger design analysis	3	13
Seminar	discussion	Applications in Environmental Engineering	Environmental applications	3	14

—	discussion	Comprehensive review	General review	3	15
71. Course evaluation					
• Short tests : ٢٠% • Online assignments : ١٠% • Project : ٥% • Seminar : ٥% • Midterm exam : ١٠% • Final exam : ٥٠%					
72. Learning and teaching resources					
Holman, J.P., <i>Heat Transfer</i> , 10th Edition, 2010.			Required textbooks (methodology, if applicable)		
Bergman, TL, Incropera , FP, DeWitt, DP, Lavine, <i>Fundamentals of Heat and Mass Transfer</i> , 8th Edition, W 2018.			Main references (sources)		
Bergman, TL, Incropera , FP, DeWitt, DP, Lavine, <i>Fundamentals of Heat and Mass Transfer</i> , 8th Edition, W 2018.			Recommended supporting books and references (scientific journals, reports...)		
Multiple electronic sources			Electronic references, websites		

Course description template

73.	: Course Name
	Soil and groundwater pollution
74.	: Course code
	ENVR- ENG-306
75.	Semester / Year : Annual
	Chapter Two / Level Three
76.	Date this description was prepared
	2026-10-07
77.	Available attendance formats:
	Theoretical lectures Practical Lessons/Exercises(Tutorial)
78.	:Number of study hours (total) / Number of units (total)
	125
79.	Name of the course coordinator (if there is more than one, please .(mention it
	Dr. Hassan Ali Ahmed m
80.	Course objectives

	.Identifying the main sources of soil and groundwater pollution .١ .Understanding the mechanisms of pollutant transfer in soil and groundwater .٢ .Assessing the environmental risks associated with pollution .٣ Selecting and applying appropriate technologies for treating contaminated sites .
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81. Teaching and learning strategies

	Strategies and methods of teaching and learning adopted in the implementation of the program in general -1 Using the best methods to deliver information to students through the use of a data projector in the lecture, which provides an opportunity to observe laboratory processes , in addition to using the whiteboard -2 Involving students in obtaining information by asking them to submit scientific reports on specific sections of the curriculum, which ensures expanding the student's cognitive ability , training them in methods of accessing information that keeps their knowledge up-to-date -3 Training students in the method of logical discussion to reach conclusions, as well as the method of deductive -4 Training the student in educational commitment in behavior inside the lecture hall or in laboratory or laboratory , in a way ensures the prevalence of proper behavior in the educational institution and after graduation -5 Learning through laboratory practices The practical application and providing students with the opportunity to apply their knowledge in the field
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82. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Lecture exercises	a Definition of soil and properties	1	4	1
			1	4	2
	Lecture exercises	a Weight and volume relationships	1	4	3
			1	4	4

duty	Lecture	a Weight and volume	1	4	5
	exercises	relationships	1	4	6
Short test	Lecture	a Soil classification	1	4	7
	exercises	Atterbeck borders	1	4	8
exam	Lecture	a Water flow in the soil	1	4	9
	exercises	Chemical properties	1	4	10
Short test	Lecture	a Midterm exam	1	4	11
	exercises	soil salinity	1	4	12
duty	Lecture	a osmotic pressure	1	4	13
	exercises	The carbon and nitrogen	1	4	14
Short test	Midterm exam	cycle	1	4	15
	Lecture	a Agricultural soil pollution			
	exercises	agricultural pesticides			
exam	Lecture	a Qualitative characteristics			
	exercises	of pesticides			
	Lecture	a Heavy metals in soil and			
	exercises	water			
	Lecture	a			
	exercises				
	Lecture	a			
	exercises				
	Lecture	a			
	exercises				
	Lecture	a			
	exercises				
	final exam				
83. Course evaluation					
, % Short tests: 1,10%, Online assignments: 2,0%, In-person assignments: 1,0%, Reports: 1,10 - .Midterm exam : 1,0 %, Final exam: 0.0%.					
84. Learning and teaching resources					
Principles of Soil Science: Abdullah Najm Al-Ani (1980) Soil Mechanics: Muhammad Omar Al- Ashou (1980)			Required textbooks (methodology (applicable		
Soil Pollution Assessment - Pesticide Disposal Series No. 8 (Food Agriculture Organization of the United Nations) / Rome (2002) Groundwater Pollution: Dr. Ahmed Al-Khatib (1993)			Main references (sources)		

	Recommended supporting books and references (scientific (...journals, reports
	Electronic references, websites

Course description template

85.	Wastewater treatment : name The course
86.	: code The course ENVR-ENG-307
87.	Term ٢/Level ٣ : Term / Year
88.	date numbers this Description: 07-10-2026
89.	Available attendance methods: In-person attendance within the classroom
90.	Total study hours/total units: ١٥٠ hours/٦ units
91.	Name of the course coordinator (if there is more than one, please .(mention it
	Dr. Masoud Mohsen Hazza
92.	Course objectives

	- Understanding the types and characteristics of wastewater and how to deal with them - Explaining the concept of wastewater treatment - Providing information on wastewater treatment methods - Explanation of the initial treatment - Explanation of the initial treatment - Determining reaction rates - Explanation of design standards Processing unit design -
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93. Teaching and learning strategies

	The learning and teaching strategy is designed to achieve the following: comprehensive coverage of the essential material and analytical techniques required in lectures, illustrated concepts with appropriate (and practical, whenever possible) examples, and allow sufficient time for students to practice techniques using a large number of carefully selected practice problems
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94. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Lecture & exercises	The concept of wastewater and its treatment	1	6	1
duty	Lecture & exercises	Types of wastewater	1	1	2
duty	Lecture & exercises	Treatment methods	1	1	3
Short test	Lecture & exercises	Processing systems	1	1	4

duty	Lecture & exercises	Basic design considerations	1	1	5
Short test	Lecture & exercises	flow rate	1	1	6
duty	Lecture & exercises	Design standards	1	1	7
exam	exam	Midterm exam	1	1	8
Solving problems	Lecture & exercises	General procedure for design calculation	1	1	9
Short test	Lecture & exercises	Hydraulic flow diagram	1	1	10
duty	Lecture & exercises	Reactions and reactors	1	1	11
duty	Lecture & exercises	The concept of interaction	1	1	12
Solving problems	Lecture & exercises	The concept of reactors	1	1	13
Project + Presentation	Problem Solving Seminar	Design of primary processing units Design of the filtration unit and sand removal unit	1	1	14

Solving problems	a lecture	Design of the primary sedimentation basin and the secondary sedimentation basin	1	7	15
95. Course evaluation					
The assessment for the Introduction to Environmental Engineering course is based on the principle of continuous and summative assessment to ensure the measurement of the achievement of the targeted learning outcomes. Formative assessment, which includes quizzes, homework, class assignments, seminars, and individual or group projects, accounts for 40% of the total grade. This assessment aims to monitor student progress and continuously enhance their learning throughout the semester. A midterm exam, which measures students' understanding of the concepts and topics covered during the first half of the semester, accounts for 10% of the grade. The final exam, which represents 50% of the total grade, is held at the end of the semester to comprehensively assess students' achievement of the course learning outcomes.					
96. Learning and teaching resources					
Wastewater treatment and reuse, Metcalf & Eddy, Fourth Edition, 2014		Required textbooks (methodology, if applicable)			
		Main references (sources)			
Wastewater Treatment Concept and design		Recommended supporting books and references (scientific journals, reports...)			
		Electronic references, websites			

Course description template

13.	Course Title : Hazardous and Radioactive Waste Management
14.	:Course codeENVR-ENG-308
15.	Term ٢ / Level ٣ :Term/Year
16.	Date this description was prepared : 07-10-2026
17.	Available forms of attendance: In-person (theoretical lectures, discussion (groups/seminars
18.	Number of study hours (total) / Number of units (total): ١٠٠ study hours / ٤ units(ECTS)
19.	.Name of course coordinator (if more than one, please state) : Prof. Dr Salwa Hadi Ahmed
20.	Course objectives

	This program aims to enable students to learn about ,types of hazardous materials, their properties, source and effects on humans and the environment, as well as methods for handling and reducing their quantities in the environment, and treatment methods. It also introduces students to the types of radioactive waste, their source and their effects on workers and the environment, and trains them in safe storage and handling methods.
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21. Teaching and learning strategies

	The learning and teaching strategy is designed to cover the essential material and analytical techniques thoroughly in lectures, and to illustrate concepts with appropriate and practical examples whenever possible. It also allows students ample time to practice these techniques using a large number of carefully selected practice problems.
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22. Course structure

Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation Method
Week1	3	Learn the principles ,characteristics and classification of hazardous waste	Introduction to Hazardous Materials	Theoretical lecture	Duties and ongoing evaluation
Week2	3	Understanding the pathways and methods of hazardous waste disposal	Paths and fates of hazardous waste emissions	Theoretical lecture	Short Quiz(Quiz 1)
Week3	3	Understanding the paths and fate of waste	Disposal of hazardous waste emissions	Theoretical lecture	/ Duties Participation

Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation Method
		disposal and emissions			
Week4	3	Understanding how hazardous waste is generated, its sources, and its generators	Sources/generators of hazardous waste	Theoretical lecture	Ongoing evaluation and discussion
Week5	3	Familiarity with waste transportation mechanisms and spill control objectives	Transport of hazardous waste	Theoretical lecture	Short Quiz(Quiz 2)
Week6	3	Learn how to process and safely dispose of waste	Methods of disposing of hazardous waste	Theoretical lecture	Homework
Week7	2	Evaluate learning outcomes on a scale of 1 to 5	Midterm exam	Written exam	Written exam (10%)
Week8	3	Learn and apply methods for treating environmentally hazardous waste.	Methods of treating hazardous waste	Theoretical lecture	Duties and Reports
Week9	3	Understanding waste management and safe incineration processes	Hazardous waste operations	Theoretical lecture	Daily evaluation and participation
Week10	3	Learn to prevent pollution and reduce waste at the source	Prevent pollution, reduce waste	Theoretical lecture	Short Quiz(Quiz 3)

Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation Method
Week11	3	Applying the principles of reuse and recycling	Reuse and recycling	Theoretical lecture	Duties and Assessment
Week12	3	Understanding and managing radioactive waste and dealing with its sources	Radioactive waste management	Lecture and discussion	Short Quiz(Quiz 4) / Seminar
Week13	3	Understanding methods of protection from radiation and its environmental effects	Radiation protection	Discussion session seminar))	Panel Discussion Evaluation(10%)
Week14	3	Classification and management of high and low level radioactive waste	Management of high and low level radioactive waste	Theoretical lecture	Short Quiz(Quiz 5)
Week15	3	Familiarity with the health and safety requirements for workers handling hazardous waste	Health and safety of workers in the field of hazardous waste	Theoretical lecture	Submission of reports and posters
Week16	3	A comprehensive assessment of all course learning outcomes	Final exam	Comprehensive written exam	Final exam(50%)

23. Course evaluation	
• Quizzes: 20% (20 marks) • Assignments: 10% (10 marks) • Discussion sessions and seminars: 10% (10 marks) • Midterm Exam: 10% (10 marks) • Final Exam: 50% (50 marks) • Overall rating: 100% (100 points)	
24. Learning and teaching resources	
• "Basic Hazardous Waste Management" by William C. Blackman, Jr., 2001, 3rd, CRC Press LLC Lewis Publishers.	Required textbooks (methodology, if applicable)
• "Handbook of Advanced Industrial and Hazardous Waste Management" by Lawrence K. Wang, Mu-Hao Sung Wang, Yung-Tse Hung, Nazih K. Shamma, and Jiaping Paul Chen, 2018, Taylor & Francis Group, LLC.	Main references (sources)
1. "Hazardous Waste, Sources, Pathways, Receptor" by Richard J. Watts, 1997. 2. "Hazardous Materials Spills Handbook" by F. Bennett, Frank S. Feate, Ira Wilder, 1982. Gary.	Recommended supporting books and references (scientific journals, reports...)
Research sites and university library for independent student research	Electronic references, websites

Course description template

97. : Course Name	
Statistics and Probability	
98. :Course code	
MATH-302	
99. Semester/Year: Annual	
Chapter Two / Level Three	
100. Date this description was prepared	
2026-10-07	
101. Available attendance formats:	
Theoretical lectures Seminars and classroom discussions) Practical lessons/exercisestutorials (	
102. :Number of study hours (total) / Number of units (total)	
ECTS 4/100	
103. Name of the course coordinator (if there is more than one, please .(mention it	
Ahmed Hussein Khanfas	
104. Course objectives	
Introducing the basic concepts in statistics and .probability	

Teaching students how to collect, organize, and .present data effectively Describe the data using measures of centra .tendency and measures of dispersion Interpreting data distribution patterns, including . skewness and slant Applying the basic rules of probability and probabil .distributions to problem-solving Analyzing the relationships between variables usin .correlation and regression methods Conducting hypothesis testing and analysis of) varianceANOVA .to support data-driven decisio To enhance analytical thinking and the ability to interpret statistical results in real-world pract .applications					
105. Teaching and learning strategies					
• .The lectures explain the basic concepts • Practical lessons and exercises to enhance .practical aspect and training • Group discussions and case studies for purpose of practical application and .understanding • Assignments and short quizzes to consolid .learning and enhance student comprehensi					
106. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Lecture exercises	Introduc n Statistics	LO #1		١
homework	Lecture exercises	representa ,n : tab charts, frequency distributio	LO #2		٢

Short test	Lecture exercises	Measures central tendency : dispersion	LO #3		۳
Homework + Report Discussion	Lecture exercises	Measures central tendency : dispersion	LO #4		۴
Short test	Lecture exercises	Measures central tendency : dispersion	LO #5		۵
homework	Lecture exercises	Principle of Probabil Theory	LO #6		۶
Short test	Lecture exercises	Principle of Probabil Theory	LO #7		۷
exam	Lecture exercises	Midterm exam	LO #1,2,.7		۸
homework	Lecture exercises	Probabil distributi s	LO #9		۹
Short test	Lecture exercises	Probabil distributi s	LO #10		۱۰
homework	Lecture exercises	Link	LO #11		۱۱
Short test	Lecture exercises	decline	LO #12		۱۲
homework	Lecture exercises	Hypothe testing for) arithmeti mean a	LO #13		۱۳

		percenta (			
Short quiz+ report	Lecture exercises	Hypothes testing (arithmeti (means n	LO #14		١٤
Short test	Lecture exercises	Analysis of Variance Table	LO #15		١٥

107. Course evaluation

) The assessment for the Statistics and Probability course MATH-302 is based on a (continuous and summative assessment system to ensure the measurement of the achievement of the targeted learning outcomes. Formative assessment, which includes ,quizzes, homework, class assignments, seminars, and individual or group projects accounts for ٤٠% of the total grade. This assessment aims to monitor student progress ,and continuously enhance their learning throughout the semester. A midterm exam which measures students' understanding of the concepts and topics covered during the first half of the semester, accounts for ١٠% of the grade. The final exam, which represents ٥٠% of the total grade, is administered at the end of the semester to . comprehensively assess students' achievement of the course learning outcomes

108. Learning and teaching resources

(N/A)	Required textbooks (methodology, (applicable
Montgomery, D.C., & Runger, G.C. – App. Statistics and Probability for Engineers, 7th Editi Wiley, 2020	Main references (sources)
Devore, J.L. – Probability and Statistics for Engineering and the Sciences, 10th Edition, Cengage, 2021. Triola, M. F. – Elementary Statistics, 14th Editi Pearson, 2020.	Recommended supporting books ,and references (scientific journals (...reports
(N/A)	Electronic references, websites

Course description template

109. : Course Name
mass transfer
110. : Course code
ENVR-ENG-309
111. Semester / Year : Annual
Chapter Two / Level Three
112. Date this description was prepared
2026-10-07
113. Available attendance formats:
• In-person lectures • Practical lessons (solving problems)
114. :Number of study hours (total) / Number of units (total)
• Total course load : 100 hours/semester • Weekly hours : 7 hours • Number of units(ECTS): 4

115. Name of the course coordinator (if there is more than one, please mention it)	
Name: Dr. Ahmed Yasser Radeef Academic Title: Lecturer Academic Qualification: PhD Department: Environmental Engineering College: Engineering – Tikrit University Email: ahmed.y.radeef@tu.edu.iq	
116. Course objectives	
	7. To provide environmental engineering students with a solid scientific foundation in the principles of mass transfer and its applications. 8. Understanding the mechanisms of diffusion and mass transfer between different phases. 9. Enabling students to analyze and design mass transfer processes used in pollution control. 10. Applying mass transfer theories in environmental treatment systems such as absorption and distillation. 11. Linking mass transfer concepts to wastewater treatment applications, air pollution control, and resource recovery.
117. Teaching and learning strategies	
	• Theoretical lectures to explain the basic concepts. • Practical problem-solving sessions. • Discussion of case studies related to air and water treatment. • Individual assignments to develop analysis and deduction skills. • A mini- project about the design or analysis of an environmental separation process.
118. Course structure	

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	a lecture	Introduction to Mass Transfer	Understanding transfer concepts	3	1
duty	a lecture	diffusion patterns	Distinguishing between diffusion patterns	3	2
a test	Issues	Diffusion patterns (continued)	Analysis of diffusion laws	3	3
duty	a lecture	Diffusion coefficient measurement	Calculating Diffusion Coefficients	3	4
Short test	Issues	Spread across a changing space	Understanding diffusion across changing spaces	3	5
—	discussion	review	Preparing for the mid-year exam	3	6
exam	—	Mid-year exam	—	—	7
duty	a lecture	mass transfer theories	Understanding mass transfer theories	3	8
a test	Issues	Theories of mass transfer (continued)	Applying theories	3	9
project	a lecture	gas absorption	Understanding absorption	3	10
evaluation	Issues	Gas absorption (continued)	Analysis of absorption processes	3	11
duty	a lecture	distillation	Understanding distillation process	3	12
a test	Issues	Distillation (continued)	Distillation tower analysis	3	13
Seminar	discussion	Applications of mass transfer in environmental engineering	Environmental applications	3	14

evaluation	discussion	Applications (continued)	Linking concepts application	3	15
Short test	a lecture	Introduction to Mass Transfer	Understanding transfer concepts	3	

119. Course evaluation

- Short tests : 30%
- Online assignments : 10%
- Project : 20%
- Seminar : 20%
- Midterm exam : 10%
- Final exam : 20%

120. Learning and teaching resources

Anantharaman, N., & Begum, K. M., <i>Mass Transfer: Theory and Practice</i> , 2017.	Required textbooks (methodology, if applicable)
Treybal, R.E., <i>Mass Transfer Operations</i> , 3rd Edition.	Main references (sources)
Welty et al., <i>Fundamentals of Momentum, Heat and Mass Transfer</i> , 6th Edition, 2014.	Recommended supporting books and references (scientific journals, reports...)
Multiple electronic sources	Electronic references, websites

Course description template

121. Course Name : Engineering Hydrology
122. :Course codeENVR-ENG-310
123. Term/Year: Term 3 / Level 3
124. This description was prepared on 07-10-2026

125. Available attendance formats: Theoretical lectures and practical lessons/exercises seminars	
126. :Number of study hours (total) / Number of units (total)	
100 hr. / 4 ECTS Credits	
127. Name of the course coordinator (if there is more than one, please .(mention it	
Dr. Ahmed Saadi Mahmoud	Dr. Wissam Samir Mohammed Ali
128. Course objectives	
Studying the water cycle in nature and the importance of designing and analyzing related phenomena (such as rain and floods) according to modern programs and laws through the .application of mathematical laws and approved design methods • The student learns about the most important methods of analysis and design .used • The student learns the basic concepts of estimating and calculating the amount of .rainfall • To give the student experience in choosing the appropriate method for tracking floods using available data	
129. Teaching and learning strategies	
The Engineering Hydrology course(ENVR-ENG-310) adopts the following teaching and learn strategies: • Theoretical lectures to present the basic concepts of the water cycle in nature and its princip • Practical lessons(tutorials) for solving engineering problems and applying theoret concepts. • Seminars for developing scientific presentation anddiscussion skills. • Problem-based learning through the application of engineering principles to real-w problems.	

- Classroom discussions and direct interaction to enhance understanding and comprehension - Self-learning and homework to develop research and independent thinking skills					
130. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Lecture and exercises	Introduction to Hydrology and the Water Cycle in Nature	1	4	1
duty	Lecture and exercises	Probability in hydrology	1	4	2
Solving problems	Lecture and exercises	Rainfall and rainfall measurement	1	4	3
Short test	Lecture and exercises	Introduction to Flood Hazards	1	4	4
duty	Lecture and exercises	Estimating and calculating missing readings in rainfall	1	4	5
duty	Lecture and exercises	Rainfall calculations and cumulative hydrograph	1	4	6
Solving problems	Lecture and exercises	Evaporation and water balance calculations	1	4	7
Midterm exam	exam	Midterm exam	1	4	8
Short test	Lecture and exercises	,Water leakage ,leakage coefficient and groundwater	1	4	9
duty	Lecture and exercises	Surface runoff and groundwater runoff	1	4	10
Solving problems	Lecture and exercises	Virtual hydrograph	1	4	11
Short test	Lecture and exercises	Hydrograph unit	1	4	12

panel discussion	Lecture and exercises	Flood aftermath	1	4	13
panel discussion	Lecture and exercises	Introduction to Groundwater	1	4	14
final exam	exam	final exam	1	4	15
131. Course evaluation					
marks for quizzes, 10 marks for the discussion forum, 10 marks for assignments, 10 marks for 10 problem-solving interaction, 10 marks for the midterm exam, and 10 marks for the final exam					
132. Learning and teaching resources					
Engineering Hydrology, K. Subramanya, 2007 .			Required textbooks (methodology, if applicable)		
Hydrology for Engineering (Linsley)			Main references (sources)		
			Recommended supporting books and references (scientific journals, reports...)		
Handbook of Applied Hydrology			Electronic references, websites		

Course description template

133. : Course Name
Noise pollution
134. : Course code
ENVR-ENG-311
135. Semester / Year : Annual
Chapter Two / Level Three
136. Date this description was prepared
2026-10-07
137. Available attendance formats:
• In-person lectures • Practical lessons (solving problems)
138. :Number of study hours (total) / Number of units (total)
• : Total course load 75 hours/semester • Weekly hours : 3 hours

• Number of units(ECTS): ٣				
139. Name of the course coordinator (if there is more than one, please mention it				
Name	Hanin	Ahmed	Khudair	.Dr
Academic Title:			Assistant	Profess
Academic Qualification:				P
Department:		Environmental		Engineer
College:	Engineering	–	Tikrit	Univers
: Emailhaneen82@tu.edu.iq				
140. Course objectives				
		• Understanding the basic concepts of sound and environmental noise, their physical properties, and their effects on human health and .the environment • Identifying and classifying the sources and types of noise pollution in different urban and .industrial environments • Using standard devices and ,methods to measure, evaluate .and analyze noise levels • Applying noise control techniques and methods to reduce its effects in engineering projects and .facilities • Understanding and applying national and international		

	standards and legislation relating to environmental noise and assessing compliance with them • Recognizing the ethical and professional responsibilities of the environmental engineer in managing noise problems and protecting society and the environment • Working effectively within multidisciplinary teams to diagnose noise problems and propose appropriate solutions
141. Teaching and learning strategies	
	• Lectures: Introducing the basic concepts of noise pollution, its sources, effects, and methods of measuring and controlling it • : Classroom exercises Developing analytical and problem-solving skills through discussions and practical applications • :Self-learning Encouraging independent reading

			research, and study to promote scientific .understanding		
142. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	a lecture	Sound	Sound wave properties	3	1
duty	a lecture	Introduction to Noise Pollut	What is it Noise pollution	3	2
a test	+Lecture Applied problem	Introduction to Noise Pollut	Sources and types pollution Noise	3	3
duty	a lecture	Effects of noise pollution	Effects of noise pollution Health and Environment	3	4
Short test	a lecture	Noise characteristics	Principles of measu noise pollution	3	5
duty	a lecture	Noise characteristics	Sound intensity and ene and their relationship With noise	3	6
Midterm exam	Issues	Sound and noise levels	Sound pressure level sound intensity level	3	7
oral assessment	a lecture	Noise measurement	Noise measuring devices	3	8
duty	a lecture	Preventive measures	What are the mitiga ?measures Prevention of noise pollu	3	9
a test	a lecture	Preventive measures	Procedures and strategie Engineering in the face pollution noise	3	10
duty	Lecture + Proble	Preventive measures	Global and health regulat For levels of noise expos	3	11

project	a lecture	Industrial noise	Noise in the workplace	3	12
Project evaluation	Issues	Industrial noise	Noise in the workplace	3	13
Seminar	discussion	Applications in Environmental Engineering	Environmental applications	3	14
—	discussion	Comprehensive review	General review	3	15

143. Course evaluation

- Short tests : 20%
- Online assignments : 10%
- Project : 20%
- Seminar : 20%
- Midterm exam : 10%
- Final exam : 20%

144. Learning and teaching resources

Environmental Noise Pollution: Noise Mapping, Public Health, and Policy by Enda Murphy and Eoin A. King . Publisher: Academic Press, 2014, ISBN: 978-0124115958	Required textbooks (methodology, if applicable)
World Health Organization Guidelines for Community Noise World Health Organization Environmental Noise Guidelines for the European Region .	Main references (sources)
International Organization for Standardization Standards related to environmental noise measurement and assessment (ISO 1996 series) .	Recommended supporting books and references (scientific journals, reports...)
Multiple electronic sources	Electronic references, websites

Course description template

145. Course Title : Engineering Estimation and Specifications
146. :Course codeENVR-ENG-401
147. Semester/Year: Annual
Chapter One / Stage Four
148. Date this description was prepared : 07-10-2026
149. Available attendance formats: Theoreticallectures Practical Lessons/Exercises(Tutorial) Seminars
150. :Total study hours/total units100 /ECTS 4
151. Name of the course coordinator (if there is more than one, please .(mention it

152. Course objectives

	Understanding the basic principles and standard methods for calculating quantities in estimation Explain in detail how to estimate building costs and analyze the rate of calculating quantities for various work items Understanding the material requirements according to the specified standards and specifications Evaluate buildings and provide practical knowledge of standard specifications for building construction items
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153. Teaching and learning strategies

	The estimation and engineering specifications course depends The follow strategies are used in teaching and learning: • Theoretical lectures to introduce the basic concepts and principles of chemical engineering. • Practical lessons(Tutorials) To solve engineering problems and apply theoretical concepts. • Seminars To develop scientific presentation and discussion skills. • Problem-based learning through the application of chemical engineering principles to real-world problems. • Classroom discussions and direct interaction to enhance understanding comprehension. • Self-learning and homework to develop research and independent thinking skills
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154. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week

Short test	Lecture and exercise	Introduction to Estimation Engineering Specifications	1	3	1
duty	Lecture and exercise	General work conditions construction Principles of standard units calculating quantities for detail and abstract estimates	1	3	2
duty	Lecture and exercise	General work conditions construction Principles of standard units calculating quantities for detail and abstract estimates	1	3	3
Short test	Lecture and exercise	The approximate method estimation	1	3	4
duty	Lecture and exercise	Detailed estimates of buildings	1	3	5
Short test	Lecture and exercise	Detailed estimates of buildings	1	3	6
exam	exam	Midterm exam	1	3	7
Short test	Lecture and exercise	Estimation of excavation backfilling works	1	3	8
duty	Lecture and exercise	Appreciating open phrases channels	1	3	9
Short test	Lecture and exercise	Price analysis – calculating for different work items	1	3	10
Short test	Lecture and exercise	Price analysis – calculating for different work items	1	3	11
duty	Lecture and exercise	Price analysis – calculating for different work items	1	3	12
Short test	Lecture and exercise	Cost analysis Evaluation	1	3	13

Short test	Lecture and exercises	Building assessment, stand specifications for vari construction items Evaluation	1	3	14
duty	Lecture and exercises	Building assessment, stand specifications for vari construction items Tendering process	1	3	15

155. Course evaluation

He depends evaluation Decision Estimation and engineering specifications on principle Evaluation Continuous and evaluation Final To ensure measurement bezel verification outputs . Learning Targeted . And allocated 40% of Degree College For evaluation Formative Assessment Which Includes Tests Short, and duties domestic, and costs The classroom, and the episodes academic, and projects Individual or collectively, With the aim tracking progress Students and strengthening Teach them In picture ongoing during the chapter Academic . As well It is allocated 10% for the exam Half To measure level absorption Students For concepts And the topics that Done Her study during Half the first from Chapter . As for The exam Final It represents 50% of Degree College And it is held in end the chapter Academic To assess bezel investigation Students For outputs Learning Private As per the schedule In a way comprehensive

156. Learning and teaching resources

Quantity Surveying and Specifications, Eng. Ahmed Hus Abu Odeh, Civil Engineering Series, Part One, Al-B ,Applied University/Faculty of Engineering Techno Jordan, First Edition, ٢٠٠٨	Required textbooks (methodology, if applicable)
1. Civil Engineering and Costing, S. P. Mahajan, 624. 1042, M214. 2. Estimating Building and Construction, 692.5, H816, 73-119. 3. Civil Engineering Estimating and Costing, VANZIRANI, SP CHANDOLA, first edition, 1982.	Main references (sources)
	Recommended supporting books and references (scientific journals, reports...)
	Electronic references, websites

Course description template

157. : Course Name
Engineering Department

158. :Course code
ENVR-ENG-402
159. :Chapter/Year
Chapter One / Stage Four
160. This description was prepared on 07-10-2026
161. Available attendance formats:
My presence
162. / Total study hours/total units: 1004 ECTS
163. Name of the course coordinator (if there is more than one, please mention it
M.D. Aws Silwan Noman M.M. Saddam Hamada Hanit
164. Course objectives
Introducing students to the project lifecycle and its applications in environmental engineering projects. Developing students' skills in identifying and effectively managing stakeholders throughout different phases of the project. To provide students with the basic skills in planning and scheduling projects using support software such as Microsoft Project. Explaining the basic principles of contract management in engineering projects and the mechanisms for their application. Building students' capabilities in planning and managing large-scale environmental projects. Promoting sustainability concepts and principles in engineering project management practices.
165. Teaching and learning strategies
theoretical lectures, class discussions, and practical exercises based on examples from environmental engineering projects. Students will also participate in group activities and short case studies designed to apply project planning and scheduling techniques in real-world contexts, using Microsoft Project. To support project planning, monitoring, and management processes.

166. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
	a lecture	Introduction to Project Management, Principles of Project Management, basic terminology Approved references	Defining the stages of the engineering project lifecycle and explaining its importance in projects Environmental engineering.	3	1
	a lecture	Characteristics of construction projects, project phases, and responsibilities of the project manager	Defining the stages of the engineering project lifecycle and explaining its importance in projects Environmental engineering.	3	2
	a lecture	Time management and scheduling using bar chart (Bar Chart) and Financial Equity	Applying planning techniques and Development timelines. Project timelines.	3	3
	a lecture	Planning, control, and network setup techniques Time(Networks)	Applying planning techniques and Development timelines. Project timelines.	3	4
	Examples Applied	Planning, control, and network setup techniques Time(Networks)	Applying planning techniques and Development timelines. Project timelines.	3	5
	a lecture	Planning, control, and network setup techniques Time(Networks)	Applying planning techniques and Development timelines. Project timelines.	3	6
	Case study	Planning, control, and network setup techniques Time(Networks)	Applying planning techniques and Development timelines. Project timelines.	3	7
		Midterm Exam	Assessing comprehension level Students for previous topics.	3	8
	a lecture	Time-Cost Relationship	Explanation of basics of construction management In engineering projects	3	9

			And monitor performance.		
	a lecture	Resource allocation management Use it(Resource Allocation)	Developing strategies Project planning & coordination The large one, take into consideration Available resources	3	10
	a lecture	Program Evaluation and Review Methodology(PERT)	Developing strategies Project planning & coordination The large one, take into consideration Available resources	3	11
	a lecture	Line of balance style Balance (LOB)	Developing strategies Project planning & coordination The large one, take into consideration Available resources	3	12
	Case study	Balance line style (LOB) – Case Study and Practical Applications	Developing strategies Project planning & coordination The large one, take into consideration Available resources	3	13
	a lecture	Introduction to sustainability and principles in management Engineering projects	Integrating concepts Sustainability considerations Environmental considerations project management	3	14
	discussion collective	Sustainability in environmental engineering projects Discussion and practical applications	Integrating concepts Sustainability considerations Environmental considerations project management	3	15
167. Course evaluation					
168. Learning and teaching resources					
Kerzner, H. (2022). <i>Project management: A systems approach to planning, scheduling, and controlling (14th ed.)</i> . Hoboken, NJ: John Wiley & Sons			Required textbooks (methodology, if applicable)		
Oberlender, G. D., & Trost, S. M. (2019). <i>Project management for engineering and construction (4th ed.)</i> . New York, NY: McGraw-Hill Education.			Main references (sources)		

Additional materials: lecture notes, case studies, and selected journal articles relevant to environmental engineering projects	Recommended supporting books and references (scientific journals, reports...)
	Electronic references, websites

Course description template

25.	: Course Name	Systems Simplified Treatment waters waste
26.	: Course code	ENVR-ENG-403
27.	First Term/Fourth Stage	: Term/Year
28.	Date this description was prepared	07-10-2026
29.	Available attendance formats:	In-person
30.	: Total study hours/total units	150 hours / 6 ECTS units
31.	. Name of course coordinator (if more than one, please state)	: Prof. Dr Salwa Hadi Ahmed

32. Course objectives					
	This course aims to enable students to develop an understanding of aerobic and anaerobic biological treatment processes, and to design simplified and diverse wastewater treatment systems based on the growth of suspended and immobilized microorganisms, which vary in their forms and design requirements. It also aims to equip students with an understanding of the removal mechanism of each system, whether operating in batches or continuously, under aerobic and anaerobic conditions. Furthermore, it aims to provide students with the ability to design an integrated treatment system for a residential city using one of the simplified systems.				
33. Teaching and learning strategies					
	• Accurate coverage of the core material and the necessary analytical techniques during the lectures. • Explain the concepts using relevant and practical examples (whenever possible). • Providing students with ample time to practice analytical techniques by solving a large number of carefully selected tutorial problems.				
34. Course structure					
Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation Method
Week1	4.2	Understanding basic concepts and identifying stuck systems	Design of Secondary Biological Treatment Units - Suspended Growth Process (Extended Aeration System)	Lectures and exercises	Ongoing / assessment duties
Week2	4.2	The ability to design simplified systems	Oxidation Ditch	Lectures and exercises	Short Quiz (Quiz 1) / Assignments
Week3	4.2	Understanding the design standards for air lakes	Aerated Lagoon	Lectures and exercises	Ongoing / assessment duties
Week4	4.2	Identifying the purposes of wastewater	Waste stabilization pond	Lectures and exercises	Ongoing / assessment duties

Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation Method
		treatment and stabilization ponds			
Week5	4.2	Understanding aerobic growth processes	Design of aerobic biological treatment units: Attached growth processes	Lectures and exercises	Short Quiz (Quiz 2) / Assignments
Week6	4.2	The ability to design permeable filters	Trickling filters	Lectures and exercises	Ongoing / assessment duties
Week7	4.2	Measuring the extent of understanding of learning outcomes(1-6)	Midtermexam	Written exam	Term test
Week8	4.2	Understanding and designing bio-zodiac signs	Bio Towers	Lectures and exercises	Ongoing / assessment duties
Week9	4.2	Design of rotating bio-contacts	RBC units	Lectures and exercises	Ongoing / assessment duties
Week10	4.2	Understanding anaerobic stabilized growth processes	Design of anaerobic biological treatment units: Attached growth processes Packed bed up-flow and down-flow reactors	Lectures and exercises	Short Quiz (Quiz 3) / Assignments
Week11	4.2	Understanding the operating mechanism of extended bed and fluidized bed reactors	Extended bed reactor; Fluidized bed reactor	Lectures and exercises	Ongoing / assessment duties
Week12	4.2	Design of upflow anaerobic sludge blanket reactors	Up-flow anaerobic sludge blanket reactor	Lectures and exercises	Short Quiz (Quiz 4) / Assignments

Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation Method
				exercises	
Week13	4.2	Design of anaerobic treatment units with suspended growth	Design of anaerobic biological treatment units: Suspended growth processes	Lectures and exercises	Ongoing / assessment duties
Week14	4.2	Ability to design secondary sedimentation units	Secondary Clarification	Lectures and exercises	Short Quiz (Quiz 5) / Assignments
Week15	4.2	Understanding and calculating methane production	Methane Gas Production	Lectures and exercises	mini project
Week16	4.2	Comprehensive assessment of all course learning outcomes	FinalExam	Written exam	final exam

Course evaluation

• Quizzes: 10% (10 marks) - Weeks: 2, 5, 10, 12, 14
• Online Assignments: 10% (10 marks) - Continuous throughout the semester
• Homework: 10% (10 marks) - continues throughout the semester
• Mini Project: 10% (10 marks) - End of Term
• Midterm Exam: 10% (10 marks) - Week7
• Final Exam: 50% (50 marks) - Week16
• Total score: 100% (100 points)

Learning and teaching resources
Required textbooks (methodology):

"Wastewater treatment concepts and design approach" by GL Karia and RA Christian, 2013, 2nd edition, Delhi-110092 (available in the library).
Main references (sources):
"Fundamentals of wastewater treatment and Engineering" by Rumana Riffat, 2013, by Taylor & Francis Group, LLC CRC Press (not available in the library).
Recommended supporting books and references:
The systematic lectures and practical examples provided by the course instructor.
Electronic references, websites

Course description template

169. : Course Name										
Slag treatment										
170. : Course code										
ENVR-ENG-404										
171. Semester / Year : Annual										
Stage Four / One Chapter										
172. Date this description was prepared										
2026-10-07										
173. Available attendance formats:										
• In-person lectures • Practical lessons (solving problems)										
174. :Number of study hours (total) / Number of units (total)										
• Total course load : ١٢٥ hours/semester • Weekly hours : ٣ hours • Number of units(ECTS): ٥										
175. Name of the course coordinator (if there is more than one, please mention it										
<table border="0"> <tr> <td>Name</td> <td>Hanin</td> <td>Ahmed</td> <td>Khudair</td> <td>.Dr</td> </tr> <tr> <td>Academic</td> <td></td> <td>Title:</td> <td>Assistant</td> <td>Profes</td> </tr> </table>	Name	Hanin	Ahmed	Khudair	.Dr	Academic		Title:	Assistant	Profes
Name	Hanin	Ahmed	Khudair	.Dr						
Academic		Title:	Assistant	Profes						

Academic Department: College: Engineering : Emailhaneen82@tu.edu.iq		Qualification: Environmental – Tikrit Univers	P Engineer Univers
176. Course objectives			
		• Understanding the concepts, objectives, and stages of sludge treatment in wastewater treatment plants • Identifying the organic and inorganic components and the main pollutants present in the sludge • Applying the principles of sludge conditioning thickening, and dewatering to assess treatment efficiency • Design of sludge treatment units such as aerobic and anaerobic digestion and drying basins in accordance with engineering and environmental standards • Evaluate the performance of sludge treatment and disposal technologies and select sustainable alternatives for	

	sludge management and .utilization as a resource
177. Teaching and learning strategies	
	• Theoretical lectures: to explain the basic concepts of sludge properties and the processes ,of treating stabilizing and .disposing of it • Exercises and :problem-solving To develop analytical and design skills related to sludge treatment .units and systems • Scientific discussions: To enhance understanding of the operational and environmental aspects related to sludge .management • Case studies: to link theoretical concepts with

				practical problems and solutions in .treatment plants	
178. Course structure					
Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation Method
1	3	Understanding the concept of sludge, its importance and types in wastewater treatment plants.	Introduction to :sludge ,definition importance, and types.	Scientific lecture and discussion	Classroom questions and homework
2	3	Describe the ,physical, chemical and biological properties of sludge.	Sludge properties.	Lecture and demonstration	Classroom questions and homework
3	3	Interpreting the relationships ,between mass volume, and concentration of solids in sludge.	The basic relationships in sludge (mass and volume.	Lecture and problem-solving	Homework and exercises
4	3	Calculating the quantities of sludge generated in the different treatment units.	The amount of sludge generated.	Lecture and problem-solving	Homework and short quiz
5	3	Identifying the organic and inorganic pollutants present in the sludge.	The main pollutants in sludge.	Lecture and discussion	Classroom questions and homework
6	3	Explanation of the principles and objectives of sludge conditioning and improving its treatability.	Sludge Conditioning	Lecture and case study	Homework and class participation
7	3	Explaining the mechanisms and methods of sludge thickening and evaluating its efficiency.	Sludge thickening	Lecture and problem-solving	Short test

8	3	Comparing sludge dewatering technologies and identifying their areas of application.	Sludge dewatering	Lecture and demonstration	Homework and exercises
9	3	Assessing the level of 'students understanding of the topics covered in the previous course.	Midterm exam.	Written exam	Midterm exam
10	3	Explaining the concept of sludge digestion and its objectives in stabilizing sludge and reducing its volume.	Sludge digestion	Lecture and discussion	Classroom questions
11	3	Explanation of the principles and operation of aerobic sludge digestion systems.	Aerobic digestion of sludge.	Lecture and case study	Homework and short quiz
12	3	Explanation of the principles and operation of anaerobic sludge digestion and biogas production systems.	Anaerobic digestion of sludge.	Scientific lecture and discussion	Homework and class participation
13	3	Evaluating the process of sludge biofertilization and its environmental benefits.	Sludge Composting	Lecture and case study	duty
14	3	Comparing the available alternatives for the final disposal of sludge according to environmental standards.	Final disposal of sludge.	Lecture and discussion	Short test
15	3	Explanation of the principles and requirements of sludge landfill and its environmental impacts.	Landfilling of sludge	Lecture and demonstration	Classroom questions and homework
179. Course evaluation					

• Short tests : ۲۰% • Online assignments : ۱۰% • Project : ۵% • Seminar : ۵% • Midterm exam : ۱۰% • Final exam : ۵۰%	
180. Learning and teaching resources	
Metcalf & Eddy, Wastewater Engineering: Treatment and Resource Recovery, 5th Edition, McGraw-Hill, 2014 . Vesilind, PA, Sludge Treatment and Disposal, IV Publishing.	Required textbooks (methodology, (applicable
Tchobanoglous , G., Stensel, H.D., Tsuchihashi, and Burton, F., Wastewater Engineering: Treatment and Resource Recovery, McGraw-Hill.	Main references (sources)
WEF (Water Environment Federation), Design of Wastewater and Stormwater Pumping Stations and Sludge Management Manuals.	Recommended supporting books and references (scientific journals, reports...)
Multiple electronic sources	references , websites

Course description template

181. : Course Name
Engineering Economics
182. :Course code
ENVR-ENG-406
183. :Chapter/Year
Chapter Two / Stage Four
184. Date this description was prepared : 07-10-2026
185. Available attendance formats:
My presence
186. :Number of study hours (total) / Number of units (total)
/ 1004 ECTS
187. Name of the course coordinator (if there is more than one, please .(mention it
M.D. Aws Silwan Noman
188. Course objectives
Introducing students to the basic concepts of engineering economics and financial decision-making.
Developing students' skills in evaluating engineering alternatives using time value methods of money.
Clarifying the impact of interest rates, inflation, and depreciation on the economic aspects of projects.

Enabling students to conduct economic feasibility studies, including break-even analysis and payback period.

Integrating value management principles to support decision-making and achieve the best possible cost efficiency in projects.

Enhancing students' ability to analyze and compare investment alternatives in engineering projects.

Developing students' skills in presenting and interpreting the results of economic analysis in a way that supports informed decision-making.

189. Teaching and learning strategies

Theoretical lectures: To present the basic concepts and principles of financial analysis and engineering economics.

Practical exercises and application tutorials: To solve numerical problems and apply engineering economics methods to real-world problems.

Case Studies/ Real-world Examples: To illustrate how economic decisions are made in engineering projects and applications.

Group discussions: To develop critical thinking and enhance analytical skills and collaborative work among students.

Assignments and quizzes: To promote continuous learning and to measure the level of understanding and comprehension on a regular basis.

190. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
	a lecture	Introduction to Engineering Economics and a Review of Concepts Engineering Project Management	Understanding concepts Fundamentals of Engineering Economics Geometry and its relationship with engineering project management By managing engineering projects	3	1
	a lecture	Simple interest and compound interest calculations	Distinguishing between simple and compound interest Calculating interest rates	3	2

			Nominal and verbal		
	a lecture	Time value of money: basic concepts Financial parity	Applying time value concepts Money in evaluating alternatives Engineering.	3	3
	a lecture	Time value of money: basic concepts Financial parity (continued)	Applying time value concepts Money in evaluating alternatives Engineering.	3	4
	a lecture	Evaluating investments and comparing economic alternatives	Investment evaluation and comparison Economic alternatives for projects.	3	5
	a lecture	Evaluating investments and comparing alternatives Economic (Follow-up)	Investment evaluation and comparison Economic alternatives for projects.	3	6
	a lecture	Evaluating investments and comparing economic alternatives (Practical examples)	Investment evaluation and comparison Economic alternatives for projects.	3	7
		Midterm Exam	Assessing comprehension level Students for previous topics.	3	8
	a lecture	Effects of inflation and methods calculating it in analysis Economic	Adjusting cash flows To account for inflation in Long-term economic analysis The duration.	3	9
	a lecture	Depletion : Different Calculations and Methods	Analysis and application of methods Different depreciation methods in asset valuation.	3	10
	a lecture	Extinction : Different Calculations and Methods (Continued)	Analysis and application of methods Different depreciation methods in asset valuation.	3	11
	a lecture	Break-even analysis (Break-Even Analysis)	Conducting preliminary feasibility studies using payback analysis The tie and recovery period.	3	12

	Case study	Break-even analysis (applied case study)	Conducting preliminary feasibility studies using payback analysis The tie and recovery period.	3	13
	a lecture	Value Management	Employing Value Management Principles To enhance project's value And to improve economic efficiency	3	14
		General review and comprehensive problem solving	a group discussion	3	15
191. Course evaluation					
192. Learning and teaching resources					
<i>Engineering economy, 7th edition , Leland Blank and Anthony Tarquin, 2012</i>			Required textbooks (methodology, if applicable)		
1- Park, C.S. – <i>Contemporary Engineering Economics</i> , 6th Edition, Pearson, 2020. 2- Newnan, DG, Eschenbach, TG, & Lavelle, JP – <i>Engineering Economic Analysis</i> , 13th Edition, Oxford, 2019.			Main references (sources)		
			Recommended supporting books and references (scientific journals, reports...)		
			Electronic references, websites		

Course description template

193. Course Name : Industrial Waste Management
194. :Course codeENVR-ENG-407
195. Second Term/Fourth Stage :Term/Year
196. Date this description was prepared : 07-10-2026
197. Available attendance formats: In-person
198. Total study hours/total units: ξ Total/total units: °
199. Course Coordinator : Dr. Rand Rafe' Ahmed
200. Course objectives
:The course aims to enable students to .Understanding the concept of industrial waste, its types and sources –١ .Understanding the environmental and health impacts of industrial waste –٢ .Studying ways to reduce waste at the source –٣ .Learning about reuse and recycling techniques –٤

.Understanding the physical, chemical and biological treatment methods for industrial waste –٥ .Identifying safe storage, transportation, and final disposal methods –٦ .Implementing environmental legislation and laws related to industrial waste management –٧ .Developing the ability to choose an appropriate system for managing industrial waste –٨					
201. Teaching and learning strategies					
.١ .Theoretical lectures to explain the basic concepts of industrial waste management .٢ .Interactive learning through discussion and asking questions within the classroom .٣ .Practical training within the laboratory to demonstrate methods of classifying and treating waste .٤ Real-life case studies on industrial waste management .٥ Problem-Based . Learning .٦ .Homework assignments to prepare reports on sources of industrial waste .٧ .Presentations by students on specific topics .٨ .Teamwork to implement practical exercises in waste management .٩ .Using educational tools such as slides and demonstrations .١٠ .Field visits to treatment plants or industrial facilities					
202. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
short question	a lecture	Types and sources of pollution industrial wastewater, generation, classification of industrial pollution, sampling of industrial wastewater	A١, A٢, B١	2	1
Applied question	a lecture	Theories for reducing the impact of industrial wastewater, classification of treatment methods	A٢, B٢	2	2
Applied question	Presented with diagram practical explanation	Separate the oil to remove free oil (API) globules.	A٢, B٢	2	3
Applied question	a lecture	Chemical neutralization, coagulation, and air flotation .	A٣, B٣	2	4

Practical question report +	Lecture + Sys Diagram	Selectivedialysis	Aξ, BϚ	2	5
Applied question + discussion	+ Industrial Lec Examples	Electrodialysis: Membrane Ty and System Design	Aξ, Bξ	2	6
Applied question + discussion	+ Industrial Lec Examples	Reverseosmosis	Aξ, Bξ	2	7
Applied question + discussion	+ Industrial Lec Examples	Fouling , or membrane obstruct oxidationand reduction	AϚ, BϚ	2	8
	+ Industrial Lec Examples	Solventextraction	AϚ, BϚ	2	9
Applied question + discussion	+ Industrial Lec Examples	Carbonadsorption	Aξ, Bξ	2	10
Applied question +	+ Industrial Lec Examples	Design and definition of exchange standards	Aξ, Bξ	2	11

discussion					
Applied question + discussion	+ Industrial Examples	Lec Industrial wastewater in the industry (source and standards)	Aϣ, Bϣ	2	12
Applied question + discussion	+ Industrial Examples	Lec Oh, dairy waste, sugar wastewater	Aϣ, Bϣ	2	13
Applied question + discussion	+ Industrial Examples	Lec Industrial wastewater in chemical industries and oil refineries	Aϣ, Bξ	2	14
Applied question + discussion	+ Industrial Examples	Lec ,Wastewater in the energy industry hydroelectric power plants	Aϣ, Bϣ	2	15

203. Course evaluation

-) Theoretical tests Quizzes / Midterm / Final Exam :(
- :Practical/laboratory reports
- Design a model or simulation for wastewater treatment or present an industrial case study
- Class participation and discussions
- Asking questions, discussing with colleagues, and contributing to problem-solving

• ,Final exam : To assess the complete learning outcomes of the course including knowledge, skills, and values	
204. Learning and teaching resources	
.\MN Rao and Dutta (2009), Waste Water Treatment Oxford & IBH, New Delhi . REFERENCE BOOKS : .\Met Calf and Eddi (1979), waste water engineering, Graw hill publications, New Delhi, India . .\Mark J. Hammer and Mark J. Hammer (Jr) (2008), W	Required textbooks (methodology, if applicable)
	Main references (sources)
	Recommended supporting books and references (scientific journals, reports...)
	references , websites

Course description template

205. Course Name : Water and Wastewater Networks
206. :Course code ENVR-ENG-408
207. Second Term/Fourth Stage :Term/Year
208. This description was prepared on 07-10-2026
Available forms of attendance .°: Theoretical lectures Practical Lessons/Exercises (Tutorial)
209. : Number of study hours 150 SWL (hr / sem
210. Dr. Muhammad Taha Hammoud : Name of course coordinator mthamud@tu.edu.iq

211. Course objectives					
.This course aims to help meet the need for information gathering related to hydraulic design .Analysis of the water network, sewage network and plumbing system in buildings					
212. Teaching and learning strategies					
.Interpreting and analyzing data related to water demand and population growth .١ .Applying basic flow theories to analyze water supply pipelines .٢ .Formulating the basic principles for designing plumbing systems in buildings .٣ .Understanding the strategies for designing sewage systems .٤ .Understanding stormwater drainage system design strategies .٥					
213. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
		General introduction to water resources		٣	Week ١
		water demand studies		٣	Week ٢
		Demand forecast and growth rate		٣	Week ٣
		Water distribution system, and types of pipes used		٣	Week ٤
				٣	Week ٥
		Analysis of the water distribution system (equivalent pipes)		٣	Week ٦
				٣	Week ٧
		Water distribution system analysis (Hardy Cross system)		٣	Week ٨
				٣	Week ٩
		Plumbing system, sanitary fittings, and hot cold water in a multi-story building		٣	Week ١٠
				٣	Week ١١
		Plumbing system, sanitary fittings, and hot cold water in a multi-story building		٣	Week ١٢
				٣	Week ١٣
		Midterm exam + source of sewage		٣	Week ١٤
		Types of sewage systems		٣	Week ١٥
		Sewer system accessories		٣	Week ١٦

		Design of a sewage system Rainwater source Rainwater pipe system design Design of gutters and inlets in a rainwater drainage system Weekly review before the final exam Final exam			
214. Course evaluation					
This course aims to establish a foundational understanding of hydraulic design and piping systems engineering. Students will learn about hydraulic standards for designing water distribution networks in cities and buildings. They will also learn about the details of water and sewage networks and their accessories, and everything related to piping operations					
215. Learning and teaching resources					
		Required textbooks (methodology, if applicable)			
		Main references (sources)			
		Recommended supporting books and references (scientific journals, reports...)			
		Electronic references, websites			

Course description template

216. Course Name : Water Reuse
217. :Course codeENVR-ENG-409
218. Second Term/Fourth Stage :Term/Year
219. This description was prepared on 07-10-2026

Available forms of attendance : Theoretical lectures Practical Lessons/Exercises (Tutorial)	
220. : Number of study hours 125 SWL (hr / sem)	
221. Name of course coordinator : Dr. Muhammad Taha Hammoud m. t.hamud @ tu.edu.iq	
222. Course objectives	
Providing up-to-date technological information on water treatment efficiency	Defining the terms related to treated water and its applications
Explaining the concept of biofilms and studying their types	Explaining the concept of risk management in treated water, and the relevant guidelines and regulations
Explaining the concept of a reverse osmosis system, and how to analyze and design it	Providing information on the types of treated water storage
	Explanation of salt balance in cooling towers within the industrial uses of treated water
223. Teaching and learning strategies	
	The water reuse course is based on ENVR-ENG-409 The following strategies teaching and learning: • Theoretical lectures to introduce the basic concepts and principles of chemical engineering. • Practical lessons(Tutorials) To solve engineering problems and apply theoretical concepts. • Seminars To develop scientific presentation and discussion skills. • Problem-based learning through the application of environmental engineering principles to real-world problems. • Classroom discussions and direct interaction to enhance understanding comprehension. • Self-learning and homework to develop research and independent thinking skills.

224. Course structure					
Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
		Definition of terms used		۳	۱
		Wastewater reuse applications		۳	۲
		Problems/obstacles in wastewater re		۳	۳
		categories		۳	۴
		Components of reclaimed water		۳	۵
		Introduction to Risk Assessment		۳	۶
		Guidelines and regulations for water re		۳	۷
		Storage of reclaimed water		۳	۸
		Midterm exam		۳	۹
		Industrial water reuse		۳	۱۰
		Indicators of stability		۳	۱۱
		Groundwater recharge with rechai		۳	۱۲
		water		۳	۱۳
		Water reclamation technology		۳	۱۴
		Membrane filtration		۳	۱۵
		) Reverse osmosisRO system (		۳	۱۶
		) Reverse osmosisRO ,system		۳	
		continued		۳	
		Final exam			
225. Course evaluation					
The course covers the following topics: basic definitions and the seven main applications of treated wastewater; the limitations of its use; guidelines and principles for setting standards for ,its use; methods of storing treated wastewater; and the most important basic applications primarily industrial applications and recycling, as well as groundwater recharge. The course also .examines modern treatment technologies, most notably filtration and reverse osmosis					
226. Learning and teaching resources					
			Required textbooks (methodology, if applicable)		
			Main references (sources)		
			Recommended supporting books and references (scientific journals, reports...)		
			Electronic references, websites		