نموذج وصف البرنامج الاكاديمي

اسم الجامعة : تكريت

اسم البرنامج الاكاديمي او المهني: بكالوريوس هندسة بيئة

اسم الشهادة النهائية:بكالوريوس علوم في هندسة البيئة

النظام الدراسي: فصول دراسية

تاريخ اعداد الوصف: 2025-10-12

تاريخ مليء الملف: 2025-10-15

التوقيع

اسم رئيس القسم :م.د. اكرم خلف محمد

التاريخ: 2025-10-15

التوقيع

اسم معاون العميد للشؤون العلمية : ا.د. سعد محمود رؤوف

التاريخ: 2025-10-15

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

دقق الملف من قبل

شعبة ضمان الجودة و الاداء الجامعي : م.د.احمد ياسر رديف

التاريخ: 2025-10-15

التوقيع:

مصادقة السيد العميد

ا.م.د. سعد رمضان احمد

التاريخ:2025-10-15

Ministry education High Research Scientific
Directorate Supervision and evaluation Scientific

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 M3/2906 dated 3/5/2023 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/1clKdQNPIibNVflOlOkYKvQJGbMHtKQ-n/view?usp=sharing)

5. Other external influences

6. Program structure

* comments	Percentage	Study unit	Number of courses	Program structure
	%8.75	21	9	Institutional requirements
	%23.75	57	10	College requirements
	%67.5	162	33	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
5	MathematicsI	MATH-101	Level One
4	Engineering Mechanics	ENG-102	Level One
4	computerI	UOT-003	Level One
6	Engineering drawing	ENG-101	Level One
5	Environmental Chemistry	ENVR-ENG-101	Level One
2	Human rights and democracy	UOT-004	Level One
2	Arabic LanguageI	UOT-001	Level One
5	MathematicsII	MATH-102	Level One
5	Material resistance	ENVR-ENG-102	Level One
4	Environmental Physics	ENVR-ENG-103	Level One
5	Analytical Chemistry	ENVR-ENG-104	Level One
5	Engineering workshops	ENG-106	Level One
2	English LanguageI	UOT-002	Level One
5	Engineering analyses	MATH-201	Level Two
3	Thermodynamics	ENVR-ENG-201	Level Two
6	Principles of Fluid Mechanics	ENVR-ENG-202	Level Two
4	computerII	UOT-031	Level Two
5	Engineering surveying	ENVR-ENG-203	Level Two
2	Engineering ethics	ENVR-ENG-204	Level Two
2	Crimes of the Ba'ath regime in Iraq	UOT-005	Level Two
3	Environmental geology	ENVR-ENG-205	Level Two
5	Water supply engineering	ENVR-ENG-206	Level Two

6	fluid flow	ENVR-ENG-207	Level Two
5	Environmental Microbiology	ENVR-ENG-208	Level Two
3	Air quality engineering	ENVR-ENG-209	Level Two
2	Arabic LanguageII	UOT-011	Level Two
2	English LanguageII	UOT-021	Level Two
3	numerical analysis	MATH-301	Level Three
5	Wastewater principles	ENVR-ENG-301	Level Three
4	Solid waste management	ENVR-ENG-302	Level Three
4	Hydraulic treatment plants	ENVR-ENG-303	Level Three
4	Water quality engineering	ENVR-ENG-304	Level Three
3	heat transfer	ENVR-ENG-305	Level Three
6	Soil and groundwater pollution	ENVR-ENG-306	Level Three
4	Wastewater treatment	ENVR-ENG-307	Level Three
3	Hazardous and Radioactive Waste Management	ENVR-ENG-308	Level Three
3	Statistics and Probability	MATH-302	Level Three
3	mass transfer	ENVR-ENG-309	Level Three
4	Hydrology Engineering	ENVR-ENG-310	Level Three
3	Noise pollution	ENVR-ENG-311	Level Three
3	Estimation and engineering specifications	ENVR-ENG-401	Level Four
4	Elective courseI	----------	Level Four
3	Engineering Management	ENVR-ENG-402	Level Four
4	Simplified wastewater treatment systems	ENVR-ENG-403	Level Four
4	Slag treatment	ENVR-ENG-404	Level Four
4	Graduation ProjectI	ENVR-ENG-405	Level Four
3	Engineering Economics	ENVR-ENG-406	Level Four
4	Industrial waste management	ENVR-ENG-407	Level Four
4	Water and sewage networks	ENVR-ENG-408	Level Four
4	Water reuse	ENVR-ENG-409	Level Four
3	Elective CourseII	----------	Level Four
4	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 requirements/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
Q4	Part 3	Part 2	Part 1	B4	B3	B2	B1	A4	A3	A2	A1				
	X						X			X		essential	Mathematics**I**	MATH-101	First/2026-2025
	X						X				X	essential	Engineering Mechanics	ENG-102	First/2026-2025
			X				X				X	essential	computer**I**	UOT-003	First/2026-2025
	X						X				X	essential	Engineering drawing	ENG-101	First/2026-2025
		X				X				X		essential	Environmental Chemistry	ENVR-ENG-101	First/2026-2025
			X	X							X	essential	Human rights and democracy	UOT-004	First/2026-2025
			X		X			X				essential	Arabic Language**I**	UOT-001	First/2026-2025
	X						X			X		essential	Mathematics**II**	MATH-102	-2025 Second/2026

	X						X				X	essential	Material resistance	ENVR-ENG-102	-2025 Second/2026
	X						X				X	essential	Environmental Physics	ENVR-ENG-103	-2025 Second/2026
	X				X					X		essential	Analytical Chemistry	ENVR-ENG-104	-2025 Second/2026
X							X			X		essential	Engineering workshops	ENG-106	-2025 Second/2026
	X						X				X	essential	English Language**I**	UOT-002	-2025 Second/2026
X		X						X			X	essential	Engineering analyses	MATH-201	-2025 Second/2026
X		X						X			X	essential	Thermodynamics	ENVR-ENG-201	-2025 Second/2026
	X						X			X	X	essential	Principles of Fluid Mechanics	ENVR-ENG-202	-2025 Second/2026
		X	X				X	X				essential	computer**II**	UOT-031	-2025 Second/2026
		X						X			X	essential	Engineering surveying	ENVR-ENG-203	-2025 Second/2026

						X	X			X	X	essential	Engineering ethics	ENVR-ENG-204	-2025 Second/2026
	X							X	X	X		essential	Crimes of the Ba'ath regime in Iraq	UOT-005	-2025 Second/2026
						X	X			X	X	essential	Environmental geology	ENVR-ENG-205	-2025 Second/2026
	X				X					X		essential	Water supply engineering	ENVR-ENG-206	-2025 Second/2026
	X						X				X	essential	fluid flow	ENVR-ENG-207	-2025 Second/2026
	X						X				X	essential	Environmental Microbiology	ENVR-ENG-208	-2025 Second/2026
	X					X	X		X	X		essential	Air quality engineering	ENVR-ENG-209	-2025 Second/2026
	X					X	X		X	X		essential	Arabic Language**II**	UOT-011	-2025 Second/2026
	X						X				X	essential	English Language**II**	UOT-021	-2025 Second/2026
X		X						X			X	essential	numerical analysis	MATH-301	-2025 Third/2026

X		X						X			X	essential	Wastewater principles	ENVR-ENG-301	-2025 Third/2026
	X						X			X	X	essential	Solid waste management	ENVR-ENG-302	-2025 Third/2026
		X	X				X	X				essential	Hydraulic treatment plants	ENVR-ENG-303	-2025 Third/2026
		X						X			X	essential	Water quality engineering	ENVR-ENG-304	-2025 Third/2026
						X	X			X	X	essential	heat transfer	ENVR-ENG-305	-2025 Third/2026
	X							X	X	X		essential	Soil and groundwater pollution	ENVR-ENG-306	-2025 Third/2026
						X	X			X	X	essential	Wastewater treatment	ENVR-ENG-307	-2025 Third/2026
	X				X					X		essential	Hazardous and Radioactive Waste Management	ENVR-ENG-308	-2025 Third/2026
	X						X				X	essential	Statistics and Probability	MATH-302	-2025 Third/2026

	X						X				X	essential	mass transfer	ENVR-ENG-309	-2025 Third/2026
	X					X	X		X	X		essential	Engineering Hydrology	ENVR-ENG-310	-2025 Third/2026
	X					X	X		X	X		essential	Noise pollution	ENVR-ENG-311	-2025 Third/2026
	X						X				X	essential	Estimation and engineering specifications	ENVR-ENG-401	-2025 Fourth/2026
X		X						X			X	optional	Elective course**I**	----------	-2025 Fourth/2026
X		X						X			X	essential	Engineering Management	ENVR-ENG-402	-2025 Fourth/2026
	X						X			X	X	essential	Simplified wastewater treatment systems	ENVR-ENG-403	-2025 Fourth/2026
		X	X				X	X				essential	Slag treatment	ENVR-ENG-404	-2025 Fourth/2026
		X						X			X	essential	Graduation Project**I**	ENVR-ENG-405	-2025 Fourth/2026

						X	X			X	X	essential	Engineering Economics	ENVR-ENG-406	-2025 Fourth/2026
	X							X	X	X		essential	Industrial waste management	ENVR-ENG-407	-2025 Fourth/2026
						X	X			X	X	essential	Water and sewage networks	ENVR-ENG-408	-2025 Fourth/2026
	X				X					X		essential	Water reuse	ENVR-ENG-409	-2025 Fourth/2026
	X						X				X	optional	Elective Course**II**	----------	-2025 Fourth/2026
	X						X				X	essential	Graduation Project**II**	ENVR-ENG-410	-2025 Fourth/2026

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

Course description template

1. name The course
Mathematicsl
2. : code The course
MATH-101
3. Semester / Year : Annual:
Chapter 1 / Level 1
4. : date numbers this Description
2026-10-07
5. Available attendance formats:
- Theoreticallectures - Practical Lessons/Exercises(Tutorial)
6. :Number of study hours (total) / Number of units (total)
/150ECTS 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 conce .with appropriate and practical examples as much as possible • Providing students with ample time to practice the required techniques and skills through a large num) of carefully selected problems and exercises in practical sessions**tutorials** .(• To enhance students' understanding of mathematical concepts and develop their ability to apply ther .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, 5	4	3
Short test	Lecture and exercises	Integration techniques: Retail 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 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

12. Learning and teaching resources

Calculus and analytical geometry, George B. Thomas Addison – Wesley publishing company, 7th editi 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

Course description template

13. : Course Name	
Engineering Mechanics	
14. : Course code	
ENG- 102	
15. Semester / Year : Annual	
Chapter 1 / Level 1	
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 engineer problems.

22. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test duty Short test exam Short test duty Short test exam	Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Midterm exam Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises	Basic principles force analysis Torque and dou torque Outcome simultaneous forc parallel forces Balance Midterm exam Free body diagrar Structures gables gables center of gravity The determinati of the short friction final exam	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

	Lecture a exercises final exam				

23. Course Evaluation 1

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 1 / Level 1	**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**

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**

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 .		

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 1 / Level 1
28. : Date this description was prepared
2026-10-07
29. Available attendance formats:
1- Lectures Practical exercises -2
30. Total study hours/total units: 150ECTS 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 AutoCAD**software** effectively. • Developing skills to create two-dimensional **(2D) drawings** ,using basic geometric elements ,including lines, circles, rectangles**etc**. • **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)

33. Teaching and learning strategies

The course introduces basic drawing techniques and computer-aided design (CAD) conce
throughpractical .lectures
With ample time allocated for intensive practical training, student performance is assessed throu
.continuous formative assessment (40%)
Includes short tests, Homework, lab activities, seminars, and projects—along with a midterm ex
covers the initial concepts. Finally, the comprehensive final exam (50%) measures the overall (%
.theoretical and practical learning outcomes
This ensures continuous skills development and measurement. Accurate for engineering efficien

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 a practical exercises**	Introduction Engineering Drawing	6	6	2
Classroom assignment	**Lecture a practical exercises**	Geometric projectior	6	6	3
Electronic assignment	**Lecture a practical exercises**	Initial planni concepts Creating ba geometric shapes usi drawing commands	6	6	4
Short exam Classroom assignment	**Lecture a practical exercises**	Using assistance tool In drawing	6	6	5

Classroom assignment	**Lecture a practical exercises**	Edit and change dra shapes using e commands	6	6	6
Short exam	**Lecture a practical exercises**	Creating layers	6	6	7
exam	exam	Midterm exam	6	2	8
Classroom assignment	**Lecture a practical exercises**	Two-dimensional drawing Creating plans Detailed	6	6	9
Short exam	**Lecture a practical exercises**	Two-dimensional drawing, projections and sections	6	6	10
Classroom assignment	**Lecture a practical exercises**	3D modeling usi extrusion and fusion	6	6	11
Classroom assignment	**Lecture a practical exercises**	3D 3D modeling using command Rotation and other 3D modeling commands	6	6	12
Classroom assignment	**Lecture a practical exercises**	Hatching	6	6	13
project	**Lecture a 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 (6%), and one project (4%). The final exam, which lasts three hours, represents 50% of the overall grade, and is divided into . practical and 15% theoretical components %35

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)

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 1 / Level 1	
40. Date this description was prepared 07-10-2026	
41. Available attendance formats:	
42. Total study hours/total units: 150/6	
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 hov 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 (5**pH** .
45. Teaching and learning strategies	
	:The learning and teaching strategy is designed carefully cover the essential material analytical techniques needed in lectures, illust 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

46. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
		Introduction of environmental chemistry		2	1
		Thermodynamics, Reaction heat (CHANGING IN ENTHALPY Δ H)		2	2
		Thermodynamics, Reaction heat (CHANGING IN ENTHALPY ΔH)continued		2	3
		Calculations involving reaction enthalpy		2	4
		Thermal chemistry equation		2	5
		Thermal chemistry equation continued		2	6
		Med term exam		2	7
		Type of enthalpies		2	8
		Calculation methods of standard reaction enthalpy		2	9
		Hees law method		2	10
		Using standard format enthalpy values		2	11

		Using standard format enthalpy values		2	12
		Auto processes		2	13
		Entropy		2	14
		Adsorption and ion exchang		2	15

47. Course evaluation

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 1 / Level 1
52. date numbers this Description
2026-10-07
53. Available attendance formats:
Theoretical lectures Seminarsand 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 -1 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 -3 .Identifying the sources of human and children's rights and the characteristics and features of democracy -4 .Understanding the impact of technological development on human rights, children's rights, and democracy—5 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 cove 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 sou guarantees, and conventions related to these terms in order to utilize them in addressing negative phenomen .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 human rights democracy in anci civilizations	LO #1	2	1
homework	Lectures discussions	Human rights, childr rights, and democracy Islam	LO #2	2	2
Short test	Lectures discussions	Sources of human rig ;at the international le features characteristics democracy	LO #3	2	3
homework	Lectures discussions	Human rights sources ;the local domestic le advantages of democra	LO #4	2	4
Short test	Lectures discussions	Human rights guarant ;at the local le components democracy	LO #5	2	5
homework	Lectures discussions	International hun ;rights guarant guarantees that ensur democratic system	LO #6	2	6
Short test	Lectures discussions	,Human Rights Cou elections and th importance	LO #7	2	7
exam	exam	Midterm exam	LO #1,2,.7	2	8
homework	Lectures discussions	Technological development and ,impact on human rig children's rights, democracy	LO #9	2	9
Short test	Lectures discussions	The concept globalization, c society institutions	LO #10	2	10
+ Homework Report	Lectures discussions	Good governa ,(principles, standar referendum	LO #11	2	11

Short test	Lectures discussions	Constitution and its typ	LO #12	2	12
homework	Lectures discussions	Children's rights international conventi and treaties	LO #13	2	13
Short test	Lectures discussions	Crimes against human (genocide) and th ,impact on human rig children's rights, democratic systems	LO #14	2	14
Short test	Lectures discussions	Contemporary democracy, human child rights, and c studies of real- examples that occurred international and A .societies and in Iraq	LO #15	2	15

59. Course evaluation

) the Democracy and Human Rights courseUOT-004 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

60. Learning and teaching resources

The book "Human Rights and Democracy" is approved ministerial textbook for Ira .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 code UOT001	
3. : Semester / Year : Annual	
Chapter 1 / Level 1	
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 -1 .chapters, and enhancing students' love for the language **Understanding how to apply grammatical rules in everyday life, and -2 .knowing linguistic terminology in the fields of engineering and science** **The importance of the Arabic language in areas of daily life -3** **Using grammatical rules correctly in writing scientific reports and -4 .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 260-263 / Surah Al-Hajj Su verses (1-5)			Week 1
a test	Lectures	A noble prophetic hadith			Week 2
a test	Lectures	/ Verses from the Mu'allaqa of Amr ibn Kulth "Seven verses from the poem "Ba'iyya Ibn al-Rumi			Week 3
a test	Lectures	Human values in pre-Islamic poetry / V conjugation (Health and Illness)			Week 4
a test	Lectures	The abrogating letters/solar and lu letters			Week 5
a test	Lectures	:Parts of speech and their grammatical mar Subject and predicate			Week 6
Midterm exam	exam	Midterm exam			Week 7
a test	Lectures	Rules for writing punctuation marks / Meaning unfamiliar words in the Quran			Week 8
a test	Lectures	Rules for writing the hamza			Week 9
a test	Lectures	Common linguistic errors			Week 10
a test	Lectures	Lexicographical Schools			Week 11
a test	Lectures	Arabic Rhetoric / A General Introduction Arabic Rhetoric Its definition, linguistically and technically			Week 12
a test	Lectures	The science of rhetoric (its definition a (types			Week 13

a test	Lectures	Metaphor (its definition, types, (applications			Week 14
a test	Lectures	Review of the material's contents			Week 15
End-of-term exam	exam	End-of-term exam			Week 16

11. Course evaluation

(20) : Short tests
Yearly work /homework: (15)
Discussions: (5)
(10) : Midterm exam
Final exam : (50)

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)
/150ECTS 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 variab .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 r .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 conce .with appropriate and practical examples as much as possible • Providing students with ample time to practice the required techniques and skills through a large numbe) 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

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) minimum, and (saddle points	4	2	8
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

C alculus and analytical geometry, George B. Thomas Jr.; Addi – Wesley publishing company, 7th edition, 1988.	Required textbooks (methodology, (applicable
	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)	
6/150	
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 writi .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 essent material and analytical techniques in lectures, explaining concepts with appropri (and as practical as possible) examples. It also allows students ample time to pract .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 Strength of Mater Definition of Streng of Materials, Ac (and Reaction Simple stress Simple stress simple emotion simple emotion heat stress Half the semester, t walled cylinders thin-walled cylinder twist Twisting in thresholds Final exam	At the end of this course, the stu will be able to: apply the basic phys principles of strength of materials, use action and reaction to solve b loading problems. The phys principles presented in this course those of classical mechanics, include the basic mathema ,description of simple stress and st ,types of loading, types of be ,cylinders and thin-walled ves torsion in beams, and beam stresses . deflection	5 5 5 5 5 5 5 5 5 5 5 5 5	Week 1 Week 2 Week 3 Week 4 Week 5 Week 6 Week 7 Week 8 Week 9 Week 10 Week 16

35. Learning and teaching resources

Strength of Materials by Ferdinand L. Sing 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
2026-10-07
65. Available attendance formats:
Inside the classroom
66. :Number of study hours (total) / Number of units (total)
hours /4 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 . our environment

69. Teaching and learning strategies

	The learning and teaching strategy is designed to: carefully cover the essential material and analyt ,techniques needed in lectures, illustrate concepts with appropriate (and as practical as possible) examp

	and allow sufficient time for students to practice techniques using a large number of carefully selec .lesson problems

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 thermodynamics. Issues	1	4	**Week 1**
duty	Lecture and exercise	Energy transfer processes, radiation, surv ,in cold and hot climates, noise pollut issues	1	4	**Week 2**
duty	Lecture and exercise	Atmosphere and radiation, structure a composition of the atmosphere, atmosphe pressure, escape velocity, issues	1	4	**Week 3**
Short test	Lecture and exercise	Ozone, ozone hole, terrestrial radiation, Ea as a black body	1	4	**Week 4**
duty	Lecture and exercise	Global warming and its effects, probl solving	1	4	**Week 5**
Short test	Lecture and exercise	Water and the hydrosphere, the hydrog cycle	1	4	**Week 6**

exam		Mid-Term Exam	1	2	**Week 7**
duty	exam	,Physics of cloud formation, thunderstor problem solving	1	4	**Week 8**
Solving proble ms	Lecture and exercise	Wind, the physics of wind creation, the m forces acting on air masses, problem solvi	1	4	**Week 9**
Short test	Lecture and exercise	Friction force, problem solving	1	4	**Week 1**
duty	Lecture and exercise	Hurricanes and antihurricanes, even solutions for	1	4	**Week 1**
duty	Lecture and exercise	Earth physics, soil cycle and hydrology, wa flow and evaporation	1	4	**Week 1**
Solving proble ms	Lecture and exercise	Living energy, fossil fuels, nuclear energy	1	4	**Week 1**
Project + Present ation	Lecture and exercise	Renewable resources, energy demand a conservation	1	4	**Week 1**
	Lecture and exercise	Heat transfer and thermal insulation , h loss in buildings	1	4	**Week 1**
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 Environmental Physics: Planet Earth, Life and Climate, Ta and Francis, 200 *1*	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: 150/6	
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 hov 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 (5**pH** .
44. Teaching and learning strategies	
	:The learning and teaching strategy is designe carefully cover the essential material analytical techniques needed in lectures, illust 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

45. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
		Introduction of analy chemistry, quantitative analy qualitative analysis		2	1
		Gravimetric calculations chemical analysis		2	2
		Calculations involv concentrations of soluti physical methods, M Methods, Equivalent Method		2	3
		Dilution of solutions		2	4
		Analysis of samples by titra with standard solution		2	5
		Calculation of Oxidation Reduction titration		2	6
		Equilibrium equation		2	7
		Acid – base balance and PH solutions, Equilibrium consta		2	8
		Expression of equilibr constant in acidic medium		2	9
		Expression of equilibr constant in basic medium		2	10

		Calculation of pH of aque solution, Weak acid plus its s		2	11
		Titration curves, Strong a strong base, Weak acid-str base		2	12
		strong acid – weak base, w acid – weak base		2	13
		Acid-base indicator		2	14
		The preparatory week bef the final exam		2	15

46. Course evaluation

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 -2	
53. Total study hours/total units: 150ECTS 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 2 • Measurement workshop (3 hours) • Metalworking workshop, 12 hours • Carpentry workshop 12. • Welding workshop 12 hours • Lathe workshop 12 hours • Plumbing workshop 12 hours • Health workshops 12 hours

	• Electrical workshop (6 hours)

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 a practical exercises**	Metalworking workshop		6	2
Short exam	**Lecture a practical exercises**	Metalworking workshop		6	3
a report	**Lecture a practical exercises**	carpentry workshop		6	4
Short exam	**Lecture a practical exercises**	carpentry workshop		6	5
a report	**Lecture a practical exercises**	workshop welding		6	6
exam	**Lecture a practical exercises**	workshop welding Midterm exam		6	7
a report	exam	lathe workshop		2	8
a report	**Lecture a practical exercises**	lathe workshop		6	9
Short exam	**Lecture a practical exercises**	Plumbing workshop		6	10

project	**Lecture a practical exercises**	Plumbing worksho		6	11
a report	**Lecture a practical exercises**	Health workshops		6	12
a report	**Lecture a practical exercises**	Health workshops		6	13
a report	**Lecture a 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 (15 %), in ,addition to two assignments (8 %), 6 reports (12 %), and one project (4%). The final exam .which lasts three hours, represents 50% 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	Introduction to Technical Communication	Interactive lecture, classroom discussion, examples of technical	Collective task: Prepare a sample technical communication document for a specific audience.

		and purpose in technical writing.		documents, group activity.	
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 discuss engineering problems.	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 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	Technical writing in engineering fields I	Interactive lecture, report analysis, writing practice,	Classroom training on writing technical reports.

		content for engineering situations.		classroom exercises.	
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** *Technical Communication and Its Applications* . Prentice Hall. This is suitable as the main reference because the uploaded lectures refer to *Technical Communication and Its Applications* , 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 1 / Level 2	
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 Duties Report Discussions Midterm exam Final exam	Lectures	First-order ordinary differe equations: separable equations First-order ordinary differe ;equations: linear equat perfect equations Ordinary second-o :differential equat homogeneous; non-homogene Second-order ordi differential equations: Eu ;Cauchy differential equat solutions to power series Simultaneous linear differe equations Simultaneous linear differe equations Special functions: Gam function, midterm exam Special functions: Euler's function :Laplace transform The general method, conver special functions Laplace transform: displacem theorems, differentiation ,integration of transformat solving differential equat using the Laplace transform ,Fourier series: Euler form half-range expansion Fourier transform: Properties the Fourier transform, solv differential equations using Fourier transform Properties of the perpendicula of sine and cosine functions ,Partial differential equat separation of variables ((equations ,Partial differential equat separation of variables (w (equations Final exam	,Upon completion of this cou :students will be able to Identifying, formulating, .solving engineering problems Using mathematical analytical tools to so .engineering problems Communicate effectiv .regarding engineering proble Working efficiently within te .on engineering projects Applying engineering princi .to real-world problems	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Week 1 Week 2 Week 3 Week 4 Week 5 Week 6 Week 7 Week 8 Week 9 Week 10 Week 11 Week 12 Week 13 Week 14 Week 15 Week 16

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 : 100 hours/semester • Weekly hours : 3 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 stude with a comprehensive understanding of the ba .concepts and principles of thermodynamics 2. ,Introducing students to thermodynamic syste the properties of pure materials, and ene .transfer mechanisms 3. Enabling students to apply the first law thermodynamics to closed systems and con .volumes

	4. Developing the ability to analyze enginee .systems using mass–energy balancing 5. Explaining the role of thermodynamics improving energy efficiency and reduc .environmental impacts 6. Linking the principles of thermodynamics ,applications in environmental enginee .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 concep	Understanding the b concepts thermodynamics	3	1
duty	a lecture	Introduction and basic conc (continued)	Understanding thermodynamic syst and properties	3	2

a test	a lecture	Energy, energy transfer, general energy analysis	Understanding the form energy and the mechani of its transfer	3	3
duty	Issues	Energy, energy transfer, general energy anal (continued)	Applying energy balan principles	3	4
Short test	a lecture	Properties of pure substances	Identifying the prope of pure substances	3	5
duty	Issues	Properties of pure substar (continued)	Analysis of relationships betw thermodynamic properti	3	6
exam	—	Midterm exam	—	—	7
duty	a lecture	Energy analysis of clo systems	Application of the I Law of Thermodynamic	3	8
a test	Issues	Energy analysis of clo systems (continued)	Solving energy probl for closed systems	3	9
project	a lecture	Mass and energy analysis control volumes	Understanding control s	3	10
evaluation	Issues	Mass and energy analysis control volumes (continued)	Mass and energy balan application	3	11
duty	a lecture	Engineering applications thermodynamics	Applying the principles thermodynamics engineering	3	12
a test	Issues	Engineering applications thermodynamics (continued)	Analysis of performance of enginee systems	3	13
Seminar	discussion	Applications of thermodynar in environmental engineering	Understanding environmental applicat of thermodynamics	3	14
evaluation	discussion	Environmental Thermodynamics Applicat (continued)	Linking energy conc with environme sustainability	3	15
Short test	a lecture	Introduction to Mass Transfe	Understanding n transfer concepts	3	

82. Course evaluation

% Short tests: 20 •

% Online assignments: 10 • Project: 5% • Seminar: 5% • % Midterm exam : 10 Final exam: 50% •

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 code**ENVR-ENG-202**
75. First Semester/Level Two : Semester/Year: Annual
Chapter 1 / Level 2
76. : Date this description was prepared 2026-10-07
77. Available attendance formats: + Theoretical lectures + Practical application Practical laboratory
78. :Total study hours/total units**ECTS 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)	and 3 1	2+ 4	1

		Introduction to Fluid Mechanics Laboratory (Laboratory)			
Daily test	Theoretical practical and lectures	Review of the fundamentals of fluid .mechanics and units (Theoretical) Description of .laboratory equipment (My laboratory)	and 3 1	2+ 4	2
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 3 1	2+ 4	3
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 3 1	2+ 4	4
Reports	Theoretical and practical lectures practical laboratory	Newton's equation for the wife. (Theory) Cyclic viscometer calibration (continued) (laboratory)	and 3 1	2+ 4	5
Daily test	Theoretical and practical lectures	Principles of fluid statics and the general equation relating to pressure change. (Theoretical) Viscosity determination using a capillary tube viscometer. (Laboratory)	and 3 1	2+ 4	6
Reports	Theoretical and practical lectures	Measuring pressure in .static fluids (Theoretical)	and 3 1	2+ 4	7

	practical laboratory	Viscosity determination using a capillary tube .viscometer (continued) (Laboratory)			
exam	exam	.Midterm exam	and 3 1	6	8
Daily test	Theoretical and practical lectures	The general concept of forces acting on .submerged bodies (Theoretical) Determining hydrostatic forces. (Laboratory)	and 3 1	2+ 4	9
Reports	Theoretical and practical lectures practical laboratory	Forces acting on .submerged flat surfaces (Theoretical) Determining hydrostatic .forces (continued) (Laboratory)	and 3 1	2+ 4	10
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 3 1	2+ 4	11
Reports	Theoretical and practical lectures practical laboratory	The general concept of submerged and floating bodies. (Theoretical) Determining metastatic .height (continued) (Laboratory)	and 3 1	2+ 4	12
seminar	Theoretical and practical lectures	Stability of floating and .submerged bodies (Theoretical) Review one week before .the final exam (Practical)	and 3 1 and 7	2+ 4	13
seminar	Theoretical and practical lectures practical laboratory	Stability of floating and .submerged bodies (Theoretical) Review one week before the final exam (continued). (Practical)	and 7 ,3 ,1	2+ 4	14
seminar	Theoretical and practical lectures	Review one week before the final exam (theory)	and 7 ,3 ,1	2+ 4	15

	practical laboratory	Review one week before the final exam (continued) (practical)			
exam	exam	.The final exam	and 3 1	6	16

83. Course evaluation

,Assessment details: Formative assessment (40%) including quizzes, homework classroom activities, seminars and projects; midterm exam (10%); and final exam .for a total of 100% of the course grade ,(%50)

84. Learning and teaching resources

Basic Fluid Mechanics by John K. Vinard ا .Robert L. Street, John Wiley & Sons, 1982	Required textbooks (methodology, if applicable)
Fluid Mechanics, by Frank M. White, McGraw- .1 .Hill, 4th Edition Experiments in Fluid Mechanics (2009), by .2 .Sarbjit Singh	Main references (sources)
1	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 2
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 solv .engineering problems Basic programming concepts covered: algorithm design, data types, graphing, numerical methods, flo . 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-worl .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 (15%), online assignments (10%), in-person assignments (5%), lab (10%), midterm .exam (10%), final exam (50%)

95. Learning and teaching resources

Introduction To MATLAB For Engineering Students, Da 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: 6 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 enginee projects. 2. Developing skills in accurately measuring distances, angles, and heights, and interpreting survey d 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 succes engineering surveying applications.
104. Teaching and learning strategies
This course aims to provide environmental engineering students with fundamental knowledge in l measurement and surveying techniques. The course is generally designed to enable students to underst 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 Partici pation	Lecture + Discussi	Basic concepts space	,Understanding the basic conc definitions, objectives, and importanc surveying	2	Week 1
duty	Lecture + Prob Solving	measuring distances	Explaining the principles of dista measurement and identifying source errors	2	Week 2
Practic al assess ment	Lecture + Prac Exercises	Measuring wit chain and tape	Proper execution of chain and measurement procedures in the field	2	Week 3
Short test	+ Lec Demonstration	Calibration testing	Applying the necessary calibration correction methods	2	Week 4
duty	Problem-solving session	Measurement correction	Solving practical problems related measurement corrections using tape chain	2	Week 5
Short test	+ Lec Demonstration	Settlement principles	Explanation of leveling principles knowledge of leveling equipment	2	Week 6
practic al control	Lecture + F Training	Differential settlement	Applying differential settlement meth and solvingHI andRASE problems	2	Week 7
Midter m exam	Written exam	Midterm exam	Assessing understanding of the topics in first half of the course	2	Week 8
duty	Lecture + Prob Solving	Settlement erro	Identifying types of leveling errors applying corrections	2	Week 9

—	Lecture + prac examples	Advanced contouring leveling	Understanding contouring and advar leveling techniques	2	Week 10
Short test	Lecture + Discussi	Measuring angl	Explanation of the principles of ar measurement and its applications	2	Week 11
Practic al assess ment	+ Lec Demonstration	Theodolite Angle Measurement	Operation and explanation of the part the theodolite	2	Week 12
duty	a lecture	subsurface spac	Understanding underground survey methods	2	Week 13
—	Lecture + prac examples	circular curves	Applying the principles of circular cu and methods of signing	2	Week 14
Partici pation	Discussion + Revie	Comprehensive review	Review and integrate all space concepts	2	Week 15
Final exam	Written exam	Final exam	Demonstrate a general understanding of .course	2	Week 16

106. Course structure – practical part

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Observ ation	+ Field demonstra practical training		+ Understanding surveying instrum + Measuring distances with a tape mea Measuring horizontal angles with a measure	2	Week 1
Practic al assess	Field training		Identifying and labeling columns u rules 2, 3, and 4	2	Week 2

+ ment report					
a report	Field training		Marking a map on the ground using tape	2	Week 3
Observ + ation Report	+ Demonstra Practical Training		Identifying leveling equipment and u tools	2	Week 4
a test	Written + practical		Two-page practical test	2	Week 5
Practic al 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
Observ ation	+ Demonstra Practical Training		Understanding and using the theodolite	2	Week 9
Practic al assess ment	Field training		Measuring horizontal distances	2	Week 10
Practic al assess ment	Field training		Measuring vertical distances	2	Week 11
a report	Field training		Signing parallel and vertical lines (the (and theodolite	2	Week 12

Project evaluation	Field project		Surveying of a building using tape theodolite	2	Week 13
practical control	Field project		Marking a building on the ground u tape and theodolite	2	Week 14
Final exam	practical exam		Final practical exam	2	Week 15

107. Course evaluation

The total course grade (100 points) is distributed as follows:

Formative Assessment(40

- Quizzes: **20%** .to be conducted in weeks 6 and 13 – (marks 1

Onsite Activities: **5%** throughout the semester – (marks

- Online Assignments: **5%** throughout the semester – (marks
- Reports: 10% (10 marks) – throughout the semester.

Evaluation Final(60

- .Midterm Exam: 10% (10 marks) – Week

Final Exam: 50% (50 marks) – Week 16.

Total score: 100 points**(100%)**.

Assessment is based on short quizzes, field and online activities, reports, midterm exam, and final exam .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 courseENVR–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: 75 hours / Total units: 3 units
115. Name of the course coordinator (if there is more than one, please mention .(it Dr. Abbas Ali Kanoush :Emailkanoosh.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

) courseENVR-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 pract	?Why do we study engineering eth	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, whistleblov	5	3	12
	Lecture and practical applica	Intellectual Property and Enginee	5	3	13
	Lecture and practical applica	Case study, problem solving, semi	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" courseENVR-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 10% of the final grade. The summative exam, which represents 50% 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 Introductionto 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 code UOT005	
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.
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 1
a test	Lectures	violations order Baathist For rights and freedoms public			Week 2
a test	Lectures	effect behaviors order Baathist in the society			Week 3
a test	Lectures	effect Stage transitional in Fighting Politics authoritarianism			Week 4
a test	Lectures	The field Psychological			Week 5
a test	Lectures	The field social			Week 6
a test	Lectures	Religion and State			Week 7
Midterm exam	exam	Midterm exam			Week 8
a test	Lectures	Culture, media, and the militarization of society			Week 9
a test	Lectures	Internationally banned weapons and environme pollution			Week 10
a test	Lectures	scorched earth policy			Week 11

a test	Lectures	draining the marshes			Week 12
a test	Lectures	Mass graves and destruction of places of worship			Week 13
a test	Lectures	Real-life examples of the party's crimes From the reality of Iraqi society			Week 14
a test	Lectures	Review of the material's contents			Week 15
Final exam for the semester	exam	End-of-term exam			Week 16

11. Course evaluation

(20) : Short tests
Yearly work /homework: (15)
Discussions: (5)
(10) : Midterm exam
Final exam : (50)

12. Learning and teaching resources

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

Course description template

1. : Course Name Environmental geology
2. : Course codeENVR-ENGE-205
3. Term 2/Level 2 : Term / Year
4. Date this description was prepared : 07-10-2026
5. Available attendance formats:
In-person lectures
6. / Total study hours/total units: 3 hours 4
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 compone .(rocks and minerals) Soil, rivers, energy resources, morphology, and geolog structures (and processes and phenomena). It explains how geolog resources play a role in Environmental planning, spatial organization, and regio .development are changing our resources It also discusses the effects of geological processes on hur 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, 20 published by McGraw-Hill. "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 .	Main references (sources)
	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 150 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. -4 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 -5 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.	6	– 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.	3	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	12	–Fourth Seventh
Short daily ,quizzes homework ,assignments and the use of a real-world problem-based	Giving lectures inside the hall and taking notes during the lectures	Design of a conventional w treatment plant	Learn the basic concepts of how to design conventional water treatment plant units.	24	Eighth– Fifteenth

learning . approach					
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 (10%), final exam (50%), 2 quizzes16) homework assignments 2 ,(%4 ,(% .and project (10%) , reports (10%)

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 3 1	2+ 4	1

Daily test	Theoretical practical and lectures	Classifying flow ,according to time ,distance, acting forces .and direction (Theoretical) Calibrating an ammeter .(practical experiment) (Laboratory)	and 3 1	2+ 4	2
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 3 1	2+ 4	3
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 3 1	2+ 4	4
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 3 1	2+ 4	5
Daily test	Theoretical and practical lectures	Applications of Bernoulli's equation (theorem) Effect of the inhalation experiment (laboratory)	and 3 1	2+ 4	6
exam	exam	.Midterm exam	and 3 1	2+ 4	7
Reports	Theoretical and practical lectures practical laboratory	The energy equation in real fluid flow. (Theory) The effect of the puffing experiment. (Continued) (Laboratory)	and 3 1	6	8

Daily test	Theoretical and practical lectures	Loss of flow and friction in pipes (theoretical) Calibrating the Venturi scale (practical (experiment	and 3 1	2+ 4	9
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 3 1	2+ 4	10
Daily test	Theoretical and practical lectures	Flow through branching pipes, including series and parallel pipe systems. (Theoretical) .Reynolds' experiment (Laboratory)	and 3 1	2+ 4	11
Reports	Theoretical and practical lectures practical laboratory	The general concept of interconnected multi- .tank systems (Theoretical) .Reynolds' experiment .(Continued) (Laboratory)	and 3 1	2+ 4	12
Daily test	Theoretical and practical lectures	Pumps and turbines (theory) Determining the coefficient of friction (practical experiment) (laboratory)	and 3 1 and 7	2+ 4	13
Reports	Theoretical and practical lectures practical laboratory	Introduction to open channel flow (channel geometry and Manning's equation). (Theoretical) Determining the coefficient of friction .(experiment) (continued). (laboratory)	and 7 ,3 ,1	2+ 4	14
seminar	Theoretical and practical lectures	Review one week before the final exam (theory)	and 7 ,3 ,1	2+ 4	15

	practical laboratory	Review one week before the final exam (continued) (practical)			
exam	exam	.The final exam	and 3 1	6	16

95. Course evaluation

,Assessment details: Formative assessment (40%) including quizzes, homework classroom activities, seminars and projects; midterm exam (10%); and final exam .for a total of 100% of the course grade ,(%50)

96. Learning and teaching resources

Basic Fluid Mechanics by John K. Vinard & .Robert L. Street, John Wiley & Sons, 1982	Required textbooks (methodology, if applicable)
.1 Fluid Mechanics, by Frank M. White, McGraw-Hill, 4th Edition .2 Experiments in Fluid Mechanics (2009), by Sarbjit Singh.	Main references (sources)
1	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 courseENVR–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: 150 hours / Total units: 6 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 .1 .applications Employing the principles of microbiology and biochemistry to understand, describe, and .2 .predict biological engineering and natural processes .Developing knowledge and analytical skills related to environmental microbiology .3
9. Teaching and learning strategies

) The Environmental Microbiology courseENVR-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 applica with exercises	Microorganisms and Microbiology	3	5	1
homew	Lecture and practical applica 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, a 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 microl 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 MicrobiologyENVR-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 10% of the final grade. The summative exam, which represents of the final grade, is held at the end of the semester to comprehensively assess the %50 .extent to which students have achieved the course learning outcomes

13. Learning and teaching resources

Brock Biology of Microorganisms, M. T. Madigan, J. M. Martinl and D. Clark. 2009. Prentice Hall, NJ, 12th Edition or above	,Required textbooks (methodol (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 / 4 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
1- **Introducing students to the basic concepts of air pollution**, including the types of pollutants, their sources, and their environmental and health effects. 2- **Developing students' understanding of the weather factors affecting the spread of air pollutants**, along with learning about air quality monitoring and evaluation techniques. 3- **Enabling students to analyze and evaluate air pollution control techniques** and understand air quality standards and regulations. 4- **Encouraging students to explore sustainable solutions to improve air quality in urban areas**, including green infrastructure, smart city initiatives, and clean transportation.
22. Teaching and learning strategies
1. Delivering theoretical lectures to explain the fundamental concepts and principles related to air pollution and air quality. 2. 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 .3 quality monitoring and control techniques. Employing real Air Quality Index .4**(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 Publisher Tata McGraw-Hill ISI 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 : 50 / 2ECTS	
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 -1 .chapters, and enhancing students' love for the language **Understanding how to apply grammatical rules in everyday life, and -2 .knowing linguistic terminology in the fields of engineering and science** **The importance of the Arabic language in areas of daily life -3** **Using grammatical rules correctly in writing scientific reports and -4 .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 23-29 / Surah Yusuf, verse 7			Week 1
a test	Lectures	A noble prophetic hadith			Week 2
a test	Lectures	Verses from the poem of Al-Sharif Al-Radi / Mutanabbi's Mimiyyah			Week 3
a test	Lectures	Verses by Al-Jawahiri (Peace be upon the tower (palm trees Al-Sayyab (The Rain Song)			Week 4
a test	Lectures	Common linguistic errors			Week 5
a test	Lectures	Rules for writing the open and closed taa' / R for numbers and counted nouns			Week 6
Midterm exam	exam	Midterm exam			Week 7
a test	Lectures	Rules for writing the / ظ and ض Writing the let long and short alif			Week 8
a test	Lectures	Stages of language collection / My scho curriculum: Al-Maqayis and Al-Sahah			Week 9
a test	Lectures	Common linguistic errors			Week 10
a test	Lectures	Noun conjugation (nouns in terms (masculine and feminine genders The subjunctive and jussive moods of present tense verb			Week 11
a test	Lectures	The science of rhetoric and its impact on eloquence of speech			Week 12
a test	Lectures	,Semantic embellishments (pun, antithe (contrast Good reasoning, emphasizing praise .means of something resembling blame			Week 13

a test	Lectures	,Verbal embellishments (alliteration, rhy (quotation, allusion			Week 14
a test	Lectures	Review of the material's contents			Week 15
End-of- term exam	exam	End-of-term exam			Week 16

11. Course evaluation

(20) : Short tests
Yearly work /homework: (15)
Discussions: (5)
(10) : Midterm exam
Final exam : (50)

12. Learning and teaching resources

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

Course description template

1. Course Name : English 2	
2. UOT-021	
3. Term / Year : Level Two/Semester Two	
4. Date this description was prepared : 07-10-2026	
5. Available attendance formats: Theoretical lectures	
6. / Total study hours/total units: 502 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 auxil) 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 professio .contexts Understanding the rules of definite and indefinite articles. Distinguishing between**a/an/the** and using th .accurately in English sentences Developing reading comprehension skills. Improving the ability to read scientific and medical texts, ans

	comprehension questions, and extract esser .information from them

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 stude 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 wi recruitment procedures mus gone through in the process	1	2	1
duty	a lecture	acquire the special terminol used in job applications recruitment procedures	1	2	2
Short test	a lecture	Learn how to design application letter and CV	1	2	3
duty	a lecture	Have a clear idea about hov prepare for an interview and l to behave during an interview	1	2	4
Short test	a lecture	become familiar with methods of writing a “lette intent” (“statement of purpo when applied for acade studies	1	2	5
duty	a lecture	have an idea about the “lette recommendation” that will needed when applying for academic program a completing university educat	1	2	6

Short test	a lecture	**Midterm exam**	1	2	7
duty	a lecture	gain an understanding presentation techniques	1	2	8
Short test	a lecture	gain an understanding presentation techniques	1	2	9
duty	a lecture	become with familiar the b principles of "Paragr Writing"	1	2	10
Short test	a lecture	become with familiar the b principles of "Paragr Writing"	1	2	11
duty	a lecture	learn and practice the concepts of paragraph wri such as Topic Sente Supporting Senten Concluding Sentence, Unity Coherence	1	2	12
Short test	a lecture	learn and practice the concepts of paragraph wri such as Topic Sente Supporting Senten Concluding Sentence, Unity Coherence	1	2	13
duty	a lecture	gain insight into the esser principles of "Essay Writing"	1	2	14
Short test	a lecture	gain insight into the esser principles of "Essay Writing"	1	2	15

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 1 / Level 3
4. Date this description was prepared
2026-10-07
5. Available attendance formats:
Theoreticallectures 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 ther .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 the .characteristics of each .Applying the concepts of numerical methods −2 .Understanding the importance of numerical methods in practical life −3 .Developing the student's understanding of numerical methods −4 .Trying to come up with new numerical concepts −5

10. Course structure

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

Short test duty Short test exam Short test duty Short test exam	Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Midterm exam Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises final exam	Numerical metho (introduction) Numerical solution to differential equation Matrices and th applications Matrices and th applications Linear interpolation Curve approximation numerical integration Midterm exam Gauss's quadratic equatio Applying the solution to differential equation Applying the solution to differential equation Applying the solution to differential equation Fourier series Fourier series Fourier series	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

11. Course evaluation

,Quizzes: 15%, Online assignments: 3, 10%, Homework: 5, 5%, Assignments: 1, 10% .Seminars: 1, 10%, Midterm Final Exam: 1, 50%

12. Learning and teaching resources

C. Ray Wylie, "Advanced engineeri 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: 150 hours/6 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 -
21. Teaching and learning strategies	
	The learning and teaching strategy is designed to achieve the following: comprehens coverage of the essential material and analytical techniques required in lectures, illustra

	concepts with appropriate (and practical, whenever possible) examples, and allow sufficient time for students to practice techniques using a large number of carefully selec .practice problems

22. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Lecture exercises	The concept of wastewa and its treatment Practical: Experiment determine biological oxyg demand	1	6	1
duty	Lecture exercises	Types of wastewater Practical: Experiment determine biological dema (continued)	1	6	2
duty	Lecture exercises	Treatment methods Practical: Experiment determine the chemi demand for oxygen	1	6	3
Short test	Lecture exercises	Processing systems Practical: Experiment identify pollutants usi ultraviolet spectroscopy	1	6	4
duty	Lecture exercises	Basic design considerations Practical: Experiment identify pollutants using .photogrammetry flame	1	6	5
Short test	Lecture exercises	flow rate Practical: Identifyi pollutants using ator absorption	1	6	6
duty	Lecture exercises	Design standards Practical: Identifyi pollutants usingHPLC	1	6	7
exam	exam	Midterm exam Practical: Identifyi functional groups	1	6	8

Solving proble ms	Lecture a exercises	General procedure for desi calculation Practical: Identifyi pollutants using g chromatography	1	6	9
Short test	Lecture a exercises	Hydraulic flow diagram Practical: The molecu formula of the unkno compound	1	6	10
duty	Lecture a exercises	Reactions and reactors Practical: Characterization solid surfaces using scanni electron microscopy	1	6	11
duty	Lecture a exercises	The concept of interaction Practical: Keldale nitrog estimation	1	6	12
Solving proble ms	Lecture a exercises	The concept of reactors Practical: Determining sludge volume index	1	6	13
Project + Present ation	Problem + Solv Seminar	Design of primary processi units Practical: Determining area required for sluc thickening	1	6	14
Solvin g proble ms	a lecture	Collection basin and pumpi well Practical: Identifying oil a grease	1	6	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 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

24. Learning and teaching resources

Wastewater treatment and reuse, Metc & Eddy, Fourth Edition, 2014	Required textbooks (methodology, if applicable)
	Main references (sources)
Wastewater Treatment Concept a 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 5	
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 -2 To preserve environmental resources using appropriate processes For waste management, for example, 4Rs. ,To identify the important methods for collection, storage .processing and disposal ,Providing the design of collection routes, sanitary landfills .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 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

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 courseENVR-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 learn strategies:	

- Theoretical lectures to present the basic concepts of how treatment plants work and th principles.
- 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-wo problems.
- Classroom discussions and direct interaction to enhance understanding and comprehensio
- 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, 7 marks for assignments, 3 marks for 20 .problem-solving interaction, 10 marks for the midterm exam, and 50 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)
Treatment plant hydraulics for environmental engineers (1984 edition) | OpenLibrary	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 1 / Level 3	
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 selectedtutorial problems .

58. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short ,quizzes homework assignme ,nts midterm ,exam real-world problem-based .learning	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
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 assignments 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 eutrophicationin aquatic systems.**	**Designing effective recovery, strategies** including **managing eutrophication.** Development and application **of clean technologies**	9	9-11
Classroom assignments learning based on the existence of a real-world problem.	Classroom, lectures, notes problem-solving related to the subject matter, and watching short educational science films.	**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 Canadian Water Quality Guidelines**.	12	12-15

59. Course evaluation

Midterm exam (10%), final exam (50%), 2 quizzes (10%), 2 homework assignments (10%), 2 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	Main references (sources)

quality studies and monitoring programmes. Bartram, J., & Ballance, R. (Eds.). (1996). - Water Quality Engineering in Natural Systems, Willey Interscience , 2006, David A. Chin	
-------	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 1 / Level 3
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 : 100 hours/semester • Weekly hours : 3 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 Engineer College: Engineering – Tikrit Univers 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 classificat of heat transfer	Understanding heat tran concepts	3	1
duty	Lecture + Proble	Thermal conductivity – dimension	Distinguishing betw transition patterns	3	2
a test	Applied problem	Stable delivery	Solving connec problems	3	3
duty	a lecture	Multi-dimensional connectio	Multidimensional conductivity analysis	3	4
Short test	a lecture	Unstable delivery	Understanding unst conduction	3	5
duty	a lecture	Principles of convection	Understanding convecti	3	6

Mid-year exam	Issues	Forced pregnancy	Forced pregnancy relat application	3	7
oral assessment	a lecture	normal pregnancy	Understanding nor pregnancy	3	8
duty	Issues	Practical applications	Pregnancy systems anal	3	9
a test	a lecture	radiation and black body	Understanding ther radiation	3	10
duty	Issues	radiation laws	Calculating radia transmission	3	11
project	a lecture	Types of heat exchangers	Understanding exchangers	3	12
Project evaluation	Issues	Exchanger design	Exchanger design analy	3	13
Seminar	discussion	Applications in Environme Engineering	Environmental applicati	3	14
—	discussion	Comprehensive review	General review	3	15

71. Course evaluation

- Short tests : 20%
- Online assignments : 10%
- Project : 5%
- Seminar : 5%
- Midterm exam : 10%
- Final exam : 50%

72. Learning and teaching resources	
Holman, J.P., *Heat Transfer* , 10th Edition, 2010.	Required textbooks (methodology, if applicable)
Bergman, TL, Incropera , FP, DeWitt, DP, Lavine, *Fundamentals of Heat and Mass Transfer* , 8th Edition, Wi 2018.	Main references (sources)
Bergman, TL, Incropera , FP, DeWitt, DP, Lavine, *Fundamentals of Heat and Mass Transfer* , 8th Edition, Wi 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:	
Theoreticallectures 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 .1 .Understanding the mechanisms of pollutant transfer in soil and groundwater .2 .Assessing the environmental risks associated with pollution .3 Selecting and applying appropriate technologies for treating contaminated sites .4
81. Teaching and learning strategies	
	Strategies and methods of teaching and learning adopted in the implementation of the prog in gene **–1** Using the best methods to deliver information to students through the use of a data proje in the lecture, which provides an opportunity to observe laboratory processes , in addition to us the whiteboa **–2** Involving students in obtaining information by asking them to submit scientific reports

	specific sections of the curriculum, which ensures expanding the student's cognitive ability training them in methods of accessing information that ke their knowledge up-to-d -3 Training students in the method of logical discussion to reach conclusions, as well as method of deduct -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 graduat -5 Learning through laboratory practices The practical application and providing students . the opportunity to apply their knowledge in the field

82. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test duty Short test exam Short test duty Short test exam	Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Midterm exam Lecture a exercises Lecture a exercises	Definition of soil and properties Weight and volu relationships Weight and volu relationships Soil classification Atterbeck borders Water flow in the soil Chemical properties Midterm exam soil salinity osmotic pressure The carbon and nitrog cycle Agricultural soil polluti agricultural pesticides Qualitative characterist of pesticides	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

	Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises Lecture a exercises final exam	Heavy metals in soil a water			

83. Course evaluation

, % Short tests: 1.15%, Online assignments: 2.5%, In-person assignments: 1.5%, Reports: 1.15 - .Midterm exam : 1.0 %, Final exam: 50%

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 a 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 2/Level 3 : 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: 150 hours/6 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 .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 Processing unit design -
93. Teaching and learning strategies	
	The learning and teaching strategy is designed to achieve the following: comprehens coverage of the essential material and analytical techniques required in lectures, illustra

	concepts with appropriate (and practical, whenever possible) examples, and allow sufficient time for students to practice techniques using a large number of carefully selec .practice problems

94. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Lecture exercises	The concept of wastewa and its treatment	1	6	1
duty	Lecture exercises	Types of wastewater	1	6	2
duty	Lecture exercises	Treatment methods	1	6	3
Short test	Lecture exercises	Processing systems	1	6	4
duty	Lecture exercises	Basic design considerations	1	6	5
Short test	Lecture exercises	flow rate	1	6	6
duty	Lecture exercises	Design standards	1	6	7
exam	exam	Midterm exam	1	6	8
Solving	Lecture exercises	General procedure for desi calculation	1	6	9

proble ms					
Short test	Lecture exercises	Hydraulic flow diagram	1	6	10
duty	Lecture exercises	Reactions and reactors	1	6	11
duty	Lecture exercises	The concept of interaction	1	6	12
Solving proble ms	Lecture exercises	The concept of reactors	1	6	13
Project + Present ation	Problem + Solv Seminar	Design of primary processi units Design of the filtration u and sand removal unit	1	6	14
Solvin g proble ms	a lecture	Design of the primary sedimentation basin and the secondary sedimentation basin	1	6	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, Metc & Eddy, Fourth Edition, 2014	Required textbooks (methodology, if applicable)
	Main references (sources)
Wastewater Treatment Concept a 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 2 / Level 3 :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): 100 study hours / 4 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, sour and effects on humans and the environment, as well methods for handling and reducing their quantities in environment, and treatment methods. It also introdu ,students to the types of radioactive waste, their sour and their effects on workers and the environment, trains them in safe storage and handling methods.
21. Teaching and learning strategies	
	The learning and teaching strategy is designe cover the essential material and analyt

	techniques thoroughly in lectures, and to illust concepts with appropriate and practical examp whenever possible. It also allows students an time to practice these techniques using a la number of carefully selected practice problems

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 and emissions	Disposal of hazardous waste emissions	Theoretical lecture	/ Duties Participation
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	Methods of disposing of	Theoretical lecture	Homework

Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation Method
		safely dispose .of waste	hazardous waste		
Week7	2	Evaluate learning outcomes on a scale of 1 to5	**Midterm exam**	Written exam	Written exam (10%)
Week8	3	Learn and apply methods for treating environmentall y 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)
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%)

Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation Method
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 andseminars:** 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. Shammas, 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 stu 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 statistic .and probability ,Teaching students how to collect, organiz .and present data effectively Describe the data using measures of centr .tendency and measures of dispersion ,Interpreting data distribution patterns . including skewness and slant Applying the basic rules of probability an .probability distributions to problem-solving Analyzing the relationships between variable .using correlation and regression methods Conducting hypothesis testing and analysis) varianceANOVA to support data-drive .decisions	

To enhance analytical thinking and the abili to interpret statistical results in real-w .practical applications	

105. Teaching and learning strategies

- .The lectures explain the basic concepts
- Practical lessons and exercises to enhar .the practical aspect and training
- Group discussions and case studies for purpose of practical application a .understanding
- Assignments and short quizzes to consolid .learning and enhance student comprehens

106. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	**Lecture exercises**	Introduction Statistics	LO #1		1
homework	**Lecture exercises**	,representation : tab charts, and freque distributions	LO #2		2
Short test	**Lecture exercises**	**Measures of cen tendency and dispers**	LO #3		3
+ Homework Report Discussion	**Lecture exercises**	**Measures of cen tendency and dispers**	LO #4		4
Short test	**Lecture exercises**	**Measures of cen tendency and dispers**	LO #5		5
homework	**Lecture exercises**	Principles Probability Theor	LO #6		6

Short test	**Lecture exercises**	Principles Probability Theor	LO #7		7
exam	**Lecture exercises**	Midterm exam	LO #1,2,.7		8
homework	**Lecture exercises**	Probability distributions	LO #9		9
Short test	**Lecture exercises**	Probability distributions	LO #10		10
homework	**Lecture exercises**	Link	LO #11		11
Short test	**Lecture exercises**	decline	LO #12		12
homework	**Lecture exercises**	Hypothesis testi for arithmetic) mean a (percentage	LO #13		13
Short quiz+ report	**Lecture exercises**	Hypothesis test for arithmetic mea (n	LO #14		14
Short test	**Lecture exercises**	Analysis Variance Table	LO #15		15

107. Course evaluation

) The assessment for the Statistics and Probability courseMATH-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 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 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. – Appl Statistics and Probability for Engineers, Edition, 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, 1 Edition, 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 : 3 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 stude with a solid scientific foundation in the principles of m transfer and its applications. **8.** Understanding the mechanisms of diffusion mass transfer between different phases. **9.** Enabling students to analyze and design m transfer processes used in pollution control. **10.** Applying mass transfer theories in environme treatment systems such as absorption and distillation.

	11. Linking mass transfer concepts to wastew treatment applications, air pollution control, and resou 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 Transfe	Understanding n transfer concepts	3	1
duty	a lecture	diffusion patterns	Distinguishing betw diffusion patterns	3	2
a test	Issues	Diffusion patterns (continued	Analysis of diffusion lav	3	3
duty	a lecture	Diffusion coeffic measurement	Calculating Spr Coefficients	3	4
Short test	Issues	Spread across a changing spa	Understanding diffu across changing spaces	3	5
—	discussion	review	Preparing for the midt exam	3	6
exam	—	Mid-year exam	—	—	7

duty	a lecture	mass transfer theories	Understanding n transfer theories	3	8
a test	Issues	Theories of mass tran (continued)	Applying theories	3	9
project	a lecture	gas absorption	Understanding absorption	3	10
evaluation	Issues	Gas absorption (continued)	Analysis of absorp processes	3	11
duty	a lecture	distillation	Understanding distillation process	3	12
a test	Issues	Distillation (continued)	Distillation tower analys	3	13
Seminar	discussion	Applications of mass transfe environmental engineering	Environmental applicati	3	14
evaluation	discussion	Applications (continued)	Linking concepts application	3	15
Short test	a lecture	Introduction to Mass Transfe	Understanding n transfer concepts	3	

119. Course evaluation

- Short tests : 20%
- Online assignments : 10%
- Project : 5%
- Seminar : 5%
- Midterm exam : 10%
- Final exam : 50%

120. Learning and teaching resources

Anantharaman, N., & Begum, K. M., *Mass Transfer: The and Practice* , 2017.	Required textbooks (methodology, if applicable)
Treybal , R.E., *Mass Transfer Operations* , 3rd Edition.	Main references (sources)

Welty et al., *Fundamentals of Momentum, Heat and M Transfer* , 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 2/ 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-wo problems.
- Classroom discussions and direct interaction to enhance understanding and comprehensio
- 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, 7 marks for assignments, 3 marks for 20 .problem-solving interaction, 10 marks for the midterm exam, and 50 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 load75 hours/semester • Weekly hours : 3 hours • Number of units(ECTS): 3
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 enc 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 Environme Engineering	Environmental applicatio	3	14
—	discussion	Comprehensive review	General review	3	15

143. Course evaluation

- Short tests : 20%
- Online assignments : 10%
- Project : 5%
- Seminar : 5%

- Midterm exam : 10%
- Final exam : 50%

144. Learning and teaching resources

Environmental Noise Pollution: Noise Mapping, Pu 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 No World Health Organization Environmental Noise Guidel for the European Region .	Main references (sources)
International Organization for Standardization Stand related to environmental noise measurement and assessn (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 code **ENVR-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	
Dr. Akram Khalaf Muhammad	
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
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 chem engineering. • **Practical lessons(Tutorials)** To solve engineering problems and ap theoretical concepts. • **Seminars** To develop scientific presentation and discussion skills. • **Problem-based learning** through the application of chemical enginee principles to real-world problems. • **Classroom discussions and direct interaction** to enhance understanding comprehension. • **Self-learning and homework** to develop research and independent think skills

154. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
Short test	Lecture and exercis	Introduction to Estimation Engineering Specifications	1	3	1
duty	Lecture and exercis	General work conditions construction Principles of standard units calculating quantities for detai and abstract estimates	1	3	2
duty	Lecture and exercis	General work conditions construction Principles of standard units calculating quantities for detai and abstract estimates	1	3	3
Short test	Lecture and exercis	The approximate method estimation	1	3	4
duty	Lecture and exercis	Detailed estimates of buildings	1	3	5

Short test	Lecture and exercis	Detailed estimates of buildings	1	3	6
exam	exam	Midterm exam	1	3	7
Short test	Lecture and exercis	Estimation of excavation backfilling works	1	3	8
duty	Lecture and exercis	Appreciating open phrases channels	1	3	9
Short test	Lecture and exercis	Price analysis – calculating for different work items	1	3	10
Short test	Lecture and exercis	Price analysis – calculating for different work items	1	3	11
duty	Lecture and exercis	Price analysis – calculating for different work items	1	3	12
Short test	Lecture and exercis	Cost analysis Evaluation	1	3	13
Short test	Lecture and exercis	Building assessment, stand specifications for vari construction items Evaluation	1	3	14
duty	Lecture and exercis	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 allocated40% 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 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, 2008	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 proje

.

Developing students' skills in identifying and effectively managingstakeholders throughout different phases of the project.

To provide students with the basic skills in planning and scheduling projects using support software such asMicrosoft Project.

Explaining the basic principles of contract management in engineering projects and the mechanis 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 environme engineering projects. Students will also participate in **group activities and short case studies** designe apply project planning and scheduling techniques in real-world contexts, using**Microsoft Project.** To sup 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 Proj Management, Principles ,Management, basic terminology Approved references	Defining the stages the engineering proj lifecycle and explain Its importance projects Environmental engineering.	3	1
	a lecture	Characteristics of construction projects, project phases, and responsibilities of the project manager	Defining the stages the engineering proj lifecycle and explain Its importance projects	3	2

			Environmental engineering.		
	a lecture	Time management and scheduli using bar chart (Bar Chart) and Financial Equity	Applying plann techniques and Development timelir Project timelines.	3	3
	a lecture	Planning, control, and netwo setup techniques Time(Networks)	Applying plann techniques and Development timelir Project timelines.	3	4
	Example Applied	Planning, control, and netwo setup techniques Time(Networks)	Applying plann techniques and Development timelir Project timelines.	3	5
	a lecture	Planning, control, and netwo setup techniques Time(Networks)	Applying plann techniques and Development timelir Project timelines.	3	6
	Case stud	Planning, control, and netwo setup techniques Time(Networks)	Applying plann techniques and Development timelir Project timelines.	3	7
		Midterm Exam	Assessing comprehension leve Students for previous topics.	3	8
	a lecture	Time-Cost Relationship	Explanation of basics of contr management In engineering proje And monitor performance.	3	9
	a lecture	Resource allocation a management Use it(Resource Allocation)	Developing strategie Project planning a coordination The large one, tak into consideration Available resources	3	10
	a lecture	Program Evaluation and Revi Methodology(PERT)	Developing strategie Project planning a coordination The large one, tak into consideration Available resources	3	11
	a lecture	Line of balance style Balance (LOB)	Developing strategie Project planning a coordination The large one, tak into consideration Available resources	3	12

	Case stud	Balance line style (LOB) – Case Study and Practi Applications	Developing strategie Project planning a coordination The large one, tak into consideration Available resources	3	13
	a lecture	Introduction to sustainability and principles in management Engineering projects	Integrating concepts Sustainability a considerations Environmental considerations project managemer	3	14
	discussio collective	Sustainability in environmental a – engineering projects Discussion and practi applications	Integrating concepts Sustainability a considerations Environmental considerations project managemer	3	15

167. Course evaluation

168. Learning and teaching resources

Kerzner, H. (2022). Project management: A systems appro to planning, scheduling, and controlling (14th ed .). Hobo NJ: John Wiley & Sons	Required textbooks (methodology, if applicable)
Oberlender, G. D., & Trost, S. M. (2019). *Project management for engineering and construction* (4th ed .). 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 biolog treatment processes, and to design simplified and diverse wastewater treatment systems based the growth of suspended and immobilized microorganisms, which vary in their forms and des requirements. It also aims to equip students with an understanding of the removal mechanism each system, whether operating in batches**or** .continuously, under aerobic and anaerobic conditi Furthermore, it aims to provide students with the ability to design an integrated treatment system .a residential city using one of the simplified systems
33. Teaching and learning strategies	
	• Accurate coverage of the core material and the necessary analytical techniq during the lectures. • . Explain the concepts using relevant and practical examples (whenever possible • Providing students with ample time to practice analytical techniques by solvin 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 treatment and stabilization ponds	Waste stabilization pond	Lectures and exercises	Ongoing / assessment duties
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	Ongoing / assessment duties

Week	Hours	Required learning outcomes	Unit or topic name	Learning method	Evaluation Method
				exercises	
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
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	**FinalExam**	Written exam	final exam

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

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 : 125 hours/semester • Weekly hours : 3 hours • Number of units(ECTS): 5
175. Name of the course coordinator (if there is more than one, please .(mention it
Name Hanin Ahmed Khudair .Dr Academic Title: Assistant Profes Academic Qualification: P Department: Environmental Engineer College: Engineering – Tikrit Univers : Emailhaneen82@tu.edu.iq
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.	Landfillingof sludge	Lecture and demonstration	Classroom questions and homework

179. Course evaluation

- Short tests : 20%
- Online assignments : 10%
- Project : 5%
- Seminar : 5%
- Midterm exam : 10%
- Final exam : 50%

180. Learning and teaching resources

Metcalf & Eddy, Wastewater Engineeri Treatment and Resource Recovery, 5th Editi 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: Treatm and Resource Recovery, McGraw-Hill.	Main references (sources)
WEF (Water Environment Federation), Design Wastewater and Stormwater Pumping Stations 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-mak . **Developing students' skills in evaluating engineering alternatives using time value methods of mo** . **Clarifying the impact of interest rates, inflation, and depreciation on the economic aspects of proje** . **Enabling students to conduct economic feasibility studies, including break-even analysis and cap payback period.** **Integrating value management principles to support decision-making and achieve the best poss cost efficiency in projects.** **Enhancing students' ability to analyze and compare investment alternatives in engineering projec** **Developing students' skills in presenting and interpreting the results of economic analysis in a v that supports informed decision-making.**
189. Teaching and learning strategies

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

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

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

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

Assignments and quizzes: To promote continuous learning and to measure the level of understanding 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 Engineeri Economics and a Review Concepts Engineering Project Managemen	Understanding concepts Fundamentals Economics Geometry and relationship By manag engineering project	3	1
	a lecture	Simple interest and compound interest calculations	Distinguishing between interest simple and complex Calculating inter rates Nominal and verbal	3	2
	a lecture	Time value of money: ba concepts Financial parity	Applying time va concepts Money in evaluat alternatives Engineering.	3	3
	a lecture	Time value of money: ba concepts Financial parity (continued)	Applying time va concepts Money in evaluat alternatives Engineering.	3	4
	a lecture	Evaluating investments a comparing economic alternatives	Investment evaluat and comparison Economic alternati for projects.	3	5

	a lecture	Evaluating investments a comparing alternatives Economic (Follow-up)	Investment evaluat and comparison Economic alternati for projects.	3	6
	a lecture	Evaluating investments a comparing economic alternatives (Practical examples)	Investment evaluat and comparison Economic alternati for projects.	3	7
		Midterm Exam	Assessing comprehension leve Students for previous topics.	3	8
	a lecture	Effects of inflation and methods calculating it in analysis Economic	Adjusting cash flows To account for inflat in Long-term econo analysis The duration.	3	9
	a lecture	Depletion : Different Calculatic and Methods	Analysis a application of metho Different depreciati methods in as valuation.	3	10
	a lecture	Extinction : Different Calculatic and Methods (Continued)	Analysis a application of metho Different depreciati methods in as valuation.	3	11
	a lecture	Break-even analysis (Break-Even Analysis)	Conducting preliminary feasib studies using p analysis The tie and recovery period.	3	12
	Case stuc	Break-even analysis (applied ca (study	Conducting preliminary feasib studies using p analysis The tie and recovery period.	3	13
	a lecture	Value Management	Employing Va Management Principles To enhance project's value And to improve economic efficiency	3	14
		General review a comprehensive problem solving	group discussion	3	15

191. Course evaluation	
192. Learning and teaching resources	
Engineering economy, 7th edition , Leland Bla Anthony Tarquin, 2012	Required textbooks (methodology, if applicable)
1- **Park, C.S.** – *Contemporary Engineering Economics* , 6th Edition, Pearson, 2020. 2- **Newnan, DG, Eschenbach, TG, & Lavelle, JP** – *Engineering Economic Analysis* , 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: 4 Total/total units: 5
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 -1 .Understanding the environmental and health impacts of industrial waste -2 .Studying ways to reduce waste at the source -3 .Learning about reuse and recycling techniques -4 .Understanding the physical, chemical and biological treatment methods for industrial waste -5 .Identifying safe storage, transportation, and final disposal methods -6 .Implementing environmental legislation and laws related to industrial waste management -7 .Developing the ability to choose an appropriate system for managing industrial waste -8
201. Teaching and learning strategies
.1 .Theoretical lectures to explain the basic concepts of industrial waste management .2 .Interactive learning through discussion and asking questions within the classroom .3 .Practical training within the laboratory to demonstrate methods of classifying and treating waste .4 Real-life case studies**on** .industrial waste management .5 **Problem-Based** . Learning

.6 .Homework assignments to prepare reports on sources of industrial waste

.7 .Presentations by students on specific topics

.8 .Teamwork to implement practical exercises in waste management

.9 .Using educational tools such as slides and demonstrations

.10 .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, gen ,classification of industrial pollu sampling of industrial wastewater	A1, A2, B1	2	1
Applied question	a lecture	Theories for reducing the impac industrial wastewater, classifica of treatment methods	A2, B2	2	2
Applied question	Presented wit diagram practical explanation	Separate the oil to remove free) globulesAPI .(	A3, B2	2	3
Applied question	a lecture	Chemical neutralization, coagula , and airflotation .	A3, B3	2	4
Practical question report +	Lecture + Sys Diagram	Selectivedialysis	A4, B3	2	5
Applied question + discussio n	+ Lec Industrial Examples	Electrodialysis: Membrane Ty and System Design	A4, B4	2	6
Applied question	+ Lec Industrial Examples	Reverseosmosis	A4, B4	2	7

+ discussio n					
Applied question + discussio n	+ Lec Industrial Examples	Fouling , or membrane obstruc oxidationand reduction	A3, B3	2	8
	+ Lec Industrial Examples	Solventextraction	A3, B3	2	9
Applied question + discussio n	+ Lec Industrial Examples	Carbonadsorption	A4, B4	2	10
Applied question + discussio n	+ Lec Industrial Examples	Design and definition of exchangestandards	A4, B4	2	11
Applied question + discussio n	+ Lec Industrial Examples	Industrial wastewater in the f industry (source and standards)	A2, B2	2	12
Applied question + discussio n	+ Lec Industrial Examples	Oh, dairy waste, sugar wastewate	A2, B3	2	13

Applied question + discussion	+ Lec Industrial Examples	Industrial wastewater in chem industries and oil refineries	A3, B4	2	14
Applied question + discussion	+ Lec Industrial Examples	,Wastewater in the energy indu hydroelectric power plants	A2, B3	2	15

203. Course evaluation

-) Theoretical testsQuizzes / 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

.1MN Rao and Dutta (2009), Waste Water Treatm Oxford & IBH, New Delhi . REFERENCE BOOKS : .1Met Calf and Eddi (1979), waste water engineering, Graw hill publications, New Delhi, India . .2Mark 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 .5: 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 .1 .Applying basic flow theories to analyze water supply pipelines .2 .Formulating the basic principles for designing plumbing systems in buildings .3 .Understanding the strategies for designing sewage systems .4 .Understanding stormwater drainage system design strategies .5					
213. Course structure					
Evaluation Method	Learning	Unit or topic name	Required learning	Hours	Week

	method		outcomes		
		General introduction to water resources		**3**	**Week 1**
		water demand studies		**3**	**Week 2**
		Demand forecast and growth rate		**3**	**Week 3**
		Water distribution system, and types of pi		**3**	**Week 4**
		used		**3**	**Week 5**
		Analysis of the water distribution sys		**3**	**Week 6**
		(equivalent pipes)		**3**	**Week 7**
		Water distribution system analysis (Hardy Cr		**3**	**Week 8**
		(system		**3**	**Week 9**
		Plumbing system, sanitary fittings, and hot		**3**	**Week 10**
		cold water in a multi-story building		**3**	**Week 11**
		Plumbing system, sanitary fittings, and hot		**3**	**Week 12**
		cold water in a multi-story building		**3**	**Week 13**
		Midterm exam + source of sewage		**3**	**Week 14**
		Types of sewage systems		**3**	**Week 15**
		Sewer system accessories		**3**	**Week 16**
		Design of a sewage system			
		Rainwater source			
		Rainwater pipe system design			
		Design of gutters and inlets in a rainw			
		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 code **ENVR-ENG-409**	
218. Second Term/Fourth Stage :Term/Year	
219. This description was prepared on 07-10-2026	
Available forms of attendance .5: 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 Explaining the concept of biofilms and studying .their types	Defining the terms related to treated water and its .applications 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 chem engineering.
- **Practical lessons(Tutorials)** To solve engineering problems and ap theoretical concepts.
- **Seminars** To develop scientific presentation and discussion skills.
- **Problem-based learning** through the application of environmental enginee principles to real-world problems.
- **Classroom discussions and direct interaction** to enhance understanding comprehension.
- **Self-learning and homework** to develop research and independent thinking s

224. Course structure

Evaluation Method	Learning method	Unit or topic name	Required learning outcomes	Hours	Week
		Definition of terms used		**3**	**1**
		Wastewater reuse applications		**3**	**2**
		Problems/obstacles in wastewater re categories		**3**	**3**
		Components of reclaimed water		**3**	**4**
		Introduction to Risk Assessment		**3**	**5**
		Guidelines and regulations for water re		**3**	**6**
		Storage of reclaimed water		**3**	**7**
		Midterm exam		**3**	**8**
		Industrial water reuse		**3**	**9**
		Indicators of stability		**3**	**10**
		Groundwater recharge with reclai water		**3**	**11**
		Water reclamation technology		**3**	**12**
				3	**13**

		Membrane filtration **) Reverse osmosisRO system (** **) Reverse osmosisRO ,systen** **continued** **Final exam**		**3** **3** **3**	**14** **15** **16**

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