

نموذج وصف البرنامج الأكاديمي

اسم الجامعة: تكريت

الكلية: الهندسة

القسم العلمي: هندسة الطاقة المستدامة

اسم البرنامج الأكاديمي أو المهني: بكالوريوس هندسة الطاقة المستدامة

اسم الشهادة النهائية: بكالوريوس علوم في هندسة الطاقة المستدامة

النظام الدراسي: فصول دراسية

تاريخ اعداد الوصف: 2025/9/1

تاريخ ملئ الملف: 2025/9/1

التوقيع

التوقيع

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التاريخ: ٢٠٢٥/١٠/١٣

التاريخ: ٢٠٢٥/١٠/١٣



دقق الملف من قبل

شعبة ضمان الجودة والأداء الجامعي

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التاريخ: ٢٠٢٥/١٠/١٣

التوقيع

الاستاذ المساعد الدكتور

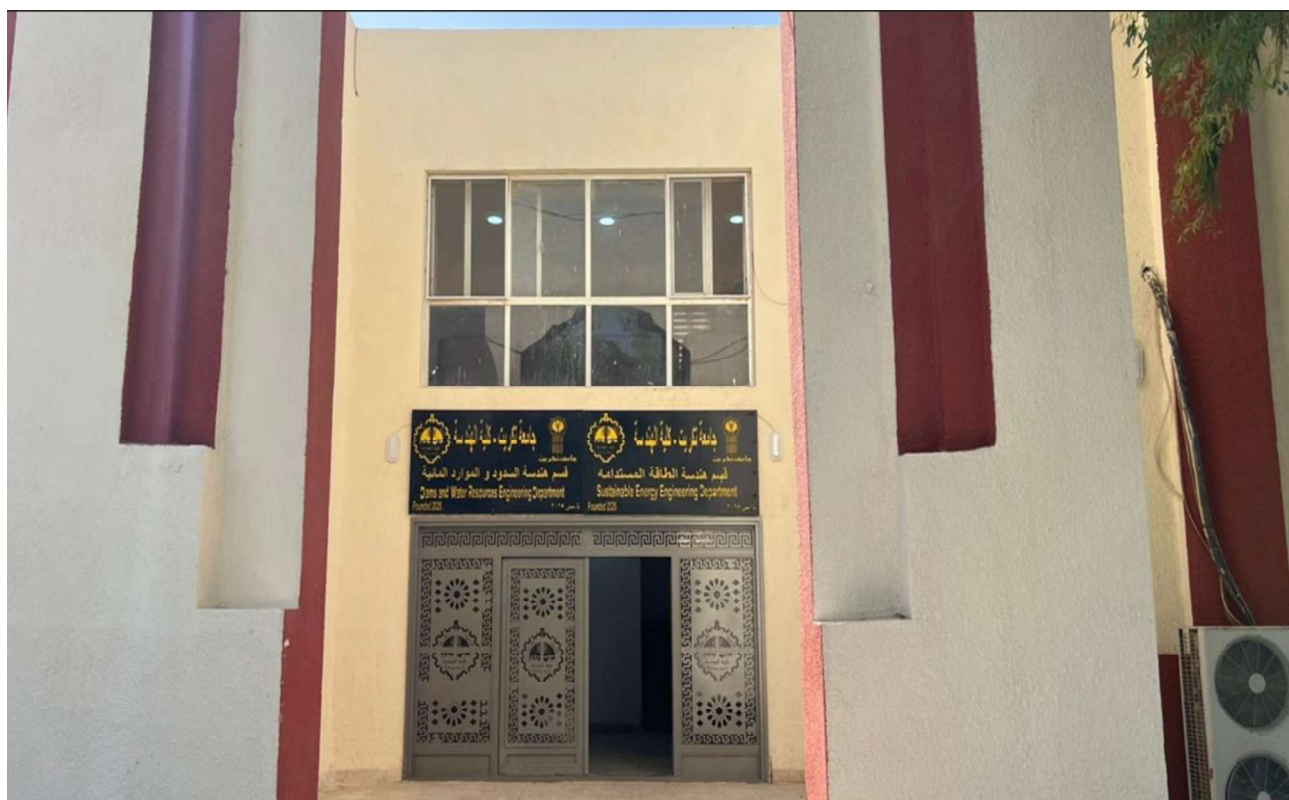
سعد رمضان احمد

عميد كلية الهندسة

Undergraduate Degree Program Catalogue | 2025-2026 |

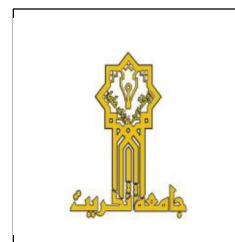


Sustainable Energy Engineering Department



bologna process 2025 - 2026

UNIVERSITY OF TIKRIT



Bachelor of Science in Sustainable Energy Engineering



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1. Mission & Vision Statement

Vision Statement

The Department of Sustainable Energy Engineering strives to become a local and regional pioneer in engineering education and scientific research in the field of clean and renewable energy, a trusted consulting source for state institutions and the private sector on energy issues, and a key partner in developing innovative and sustainable solutions to environmental challenges. This will contribute to achieving sustainable development and enhancing the reputation of the College of Engineering both locally and globally.

Mission Statement

1. Instilling a culture of excellence in teaching and learning in the field of clean and renewable energy, to graduate engineers with scientific competence and practical skills.
2. To be the preferred choice for students seeking to study energy engineering in Iraq, through a stimulating academic environment and modern educational programs.
3. Attracting and encouraging the admission of international students to enrich academic diversity and enhance the regional and global standing of the department.
4. Activating applied scientific research in the field of sustainable energy, and supporting innovative ideas to create researchers and leaders who contribute to finding solutions to energy and environmental challenges.
5. Developing curricula and linking them to the latest global advancements to build students' character and enhance their leadership and innovative skills.
6. Establishing an effective network of graduates, employers, and governmental and industrial institutions, to serve as a support for the department and the college in achieving their academic and societal goals.
- 7.

2. Program Specification

Program code:	BSc-SE_ENG	ECTS	240
Duration	4 levels, 8 Semesters	Method of Attendance:	Full Time

The Sustainable Energy Engineering Program at Tikrit University is designed to prepare highly qualified engineers with a global vision in the field of sustainable energy. It provides students with a solid academic foundation and the technical competencies required to address global challenges in sustainable energy development. The program emphasizes professionalism in engineering practice, integrating engineering principles with energy and sustainability sciences to foster innovation and leadership in engineering, technology, and sustainable development. The curriculum combines theoretical and practical aspects of renewable energy, energy efficiency, and environmental impact reduction. Students gain hands-on experience in designing, implementing, operating, and managing sustainable energy systems. The first and second levels cover the fundamentals and core subjects, preparing students for advanced research and specialization in the third and fourth levels of the program.

3. Program Objectives

The sustainable energy engineering program aims are:

1. Graduating competent engineers equipped with specialized scientific and practical skills in the fields of renewable and clean energy, and capable of competing in the local, regional, and global labor market.
2. Conducting academic and applied research in the fields of sustainable energy, energy efficiency, and storage and conversion technologies, in a way that contributes to providing practical solutions to environmental and energy challenges.
3. Contributing to the design, supervision, and consultancy of renewable energy projects and resource efficiency, in support of sustainable development in Iraq.
4. Maintaining continuous communication with government institutions and the private sector to identify energy-related problems and work on providing innovative solutions that integrate both theoretical and practical aspects.

5. Enhance the department's academic reputation through participation in global rankings and achieving academic accreditation for engineering programs in sustainable energy, while embedding a culture of total quality and continuous improvement.
6. Continuous development of curricula and postgraduate programs in line with scientific and technological advancements in clean energy, while promoting project-based learning and innovation.
7. Establishing research and academic partnerships with leading international universities and centers in the field of sustainable energy, to enhance the scientific and research level of the department.

Objectives of the educational program (Bachelor's) for the Department of Sustainable Energy Engineering - Tikrit University

1. Preparing competent engineers with the knowledge and technical and personal skills that enable them to work efficiently and effectively in the fields of sustainable and renewable energy.
2. Promoting social and ethical responsibility through participation in professional projects and practices that serve the community and protect the environment, while adhering to integrity and professional ethics.
3. Empowering graduates for continuous professional development through pursuing postgraduate studies or engaging in advanced research and career paths, with a commitment to lifelong learning to keep pace with scientific and technological advancements.

4. Student Learning Outcomes

The program strives to provide a personalized, inclusive, and world-class educational experience in alignment with the mission of Tikrit University. It equips graduates with the knowledge, skills, and values necessary to excel professionally, personally, and socially in the field of sustainable energy. The program prepares graduates to address complex global challenges, such as environmental pollution and emissions, through the application of sustainable energy principles and renewable clean energy technologies acquired during their academic journey at Tikrit University. Graduates are encouraged to actively engage in lifelong learning and continuous self-development by acquiring new skills in sustainable energy, pursuing advanced degrees, and participating in professional development opportunities that enrich both their personal and career paths. They also contribute to society and industry through collaboration, innovation, and sustainable progress that promotes global well-being.

Outcome 1

An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

Outcome 2

An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

Outcome 3

An ability to communicate effectively with a range of audiences oral and written.

Outcome 4

An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

Outcome 5

An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

Outcome 6

An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

Outcome 7

An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

5. Academic Staff

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6. Credits, Grading and GPA

Credits

Tikrit University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 student workloads, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	100 - 90	Outstanding Performance
	B - Very Good	جدا جدا	80 - 89	Above average with some errors
	C – Good	جيد	79 - 70	Sound works with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	مقبول بقرار	(45 - 49)	More work required but credit awarded
	F – Fail	راسب	(0 – 44)	Considerable amount of work required
Note:				
-NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54.				
-The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Calculation of the Grade Point Average (GPA)

The GPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

GPA of 4-year B.Sc. degrees:

$$\#GPA = [(1st \text{ module score} \times ECTS) + (2nd \text{ module score} \times ECTS) + \dots] / 240$$

7. Curriculum/Modules

Semester 1 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SE-ENG-101	introduction to Sustainable Energy Engineering	87	63	6.00	C	
MATH-101	Calculus I	87	63	6.00	B	
SE-ENG-102	Physics	87	63	6.00	B	
UOT003	Computer Sciences	45	30	3.00	S	
ENG-106	Engineering Workshops	73	52	5.00	B	
UOT002	English Language I	31	19	2.00	S	
UOT004	Democracy and Human Rights	31	19	2.00	S	

Semester 2 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
MATH-102	Calculus II	87	63	6.00	B	MATH-101
ENG-102	Engineering Mechanics	59	41	4.00	C	
SE-ENG-104	Basics of Electricity	73	52	5.00	C	
SE-ENG-205	Environment Pollution	73	52	5.00	C	
ENG-101	Engineering Drawing	45	30	3.00	C	
SE-ENG-105	Chemistry	73	52	5.00	B	

UOT001	Arabic Language I	31	19	2.00	S	
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Semester 3 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SE-ENG-201	Fluid Mechanics	73	52	5.00	C	MATH-101, MATH-102
SE-ENG-202	Thermodynamic I	73	52	5.00	C	
SE-ENG-210	Heat Transfer I	73	52	5.00	C	
MATH-201	Engineering Analysis I	87	63	6.00	B	MATH-101, MATH-102
SE-ENG-204	Engineering Materials	59	41	4.00	C	
ENG-105	Computer Programing	45	30	3.00	S	
UOT0011	Arabic Language II	31	19	2.00	S	

Semester 4 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SE-ENG-207	Thermodynamic II	87	63	6.00	C	SE-ENG-202
SE-ENG-208	Strength of Materials	73	52	5.00	C	SE-ENG-102
SE-ENG-209	Economic Energy Management and Ethics	59	41	4.00	C	
SE-ENG-317	Heat Transfer II	73	52	5.00	C	SE-ENG-202 SE-ENG-210 SE-ENG-207
MATH-202	Engineering Analysis II	87	63	6.00	B	MATH-101 MATH-102 MATH-201
UOT-021	English Language II	31	19	2.00	S	
UOT-109	Crimes of Al Bath Regime	31	19	2.00	S	

Semester 5 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SE-ENG-316	Thermal Solar Energy Systems	87	63	6.00	C	SE-ENG-210, SE-ENG-317
MATH-301	Numerical Methods	59	41	4.00	C	MATH-202
SE-ENG-326	Photovoltaic Energy Systems	73	52	5.00	C	
SE-ENG-311	Power Plant	59	41	4.00	C	
SE-ENG-203	Applied Electronics	87	63	6.00	C	
SE-ENG-313	Electric Machines	73	52	5.00	B	

Semester 6 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SE-ENG-301	Turbomachinery	87	63	6.00	C	
SE-ENG-302	Principles of Combustion and Emissions	87	63	6.00	C	
SE-ENG-303	Energy Storage Systems	73	52	5.00	C	
SE-ENG-304	Computer Engineering Design	59	41	4.00	C	
SE-ENG-305	Geothermal Energy	73	52	5.00	C	
MATH-302	Engineering Statistics	59	41	4.00	B	

Semester 7 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SE-ENG-401	Optimization	59	41	4.00	C	
SE-ENG-402	Principle of Fuel Cell Technology	87	63	6.00	C	
SE-ENG-403	Design of Sustainable Energy Systems	73	52	5.00	C	

SE-ENG-404	Mechanical Vibration	87	63	6.00	C	
SE-ENG-405	Automatic Control Systems	87	63	6.00	C	MATH-201 MATH-202
ENG-401	Graduation Project I	44	31	3.00	C	

Semester 8 | 30 ECTS

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
SE-ENG-406	Sustainable Building Design	59	41	4.00	C	
SE-ENG-407	Wind Energy Systems	87	63	6.00	C	SE-ENG-301
SE-ENG-408	Biomass Energy Systems	87	63	6.00	C	
SE-ENG-409	Intelligent Network Systems	87	63	6.00	C	
SE-ENG-410	Principles of Air Conditioning and Refrigeration	59	41	4.00	C	
ENG-402	Graduation Project II	44	56	4.00	C	

8. Contact

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2. Undergraduate Courses 2025-2026

1

Code	Course/Module Title	ECTS	Semester
SE_ENG-101	Introduction to Sustainable Energy Engineering	6	1
Class (hr/w)	Lect/Lab./Prac./ <u>Tutor</u>	SSWL (hr/sem)	USWL (hr/w)
3	3	87	63
Description			
This course will cover a range of energy sources and systems. The students will be introduced to some energy basics. The course also includes different energy sources and techniques, such as thermal and electrical solar energy systems, fuels and combustion, hydropower resources and turbines, wind energy, biofuels and biomass energy, and geothermal energy. The course also introduces energy storage.			

2

Code	Course/Module Title	ECTS	Semester
MATH-101	Calculus I	6	1
Lectures (hr/w)	Lab./ <u>Prac.</u> /Tutor(hr/w)	SSWL (hr/sem)	USSWL (hr/sem)
4	2	87	63
Description			
This course is based on the principles of Euclidean, plane, and solid geometries. Students will be introduced to the basic postulates and theorems of geometry and encouraged to extend these ideas to the topics of similarity, circles, area, volume, and proof. In addition, students are involved in a more technological, theoretical, and algebraic approach to geometry.			

3

Code	Course/Module Title	ECTS	Semester
SE_ENG-102	Physics	6	1
Lectures (hr/w)	Lab./Prac./Tutor.	SSWL (hr/sem)	USSWL (hr/w)
3	3	87	63
Description			
This course covers classical mechanics (kinematics, dynamics, work, energy, momentum), fluid mechanics, gravitation, and basic electrical and electronic principles including Ohm's law,			

diodes, and transistors.

4

Code	Course/Module Title	ECTS	Semester
UOT-003	Computer Sciences	3	1
Lectures (hr/w)	Lab./Prac./Tutor.	SSWL (hr/sem)	USSWL (hr/w)
1	2	45	30
Description			
This course offers students a comprehensive exploration of the fundamental concepts and principles that underpin the field of computer science. By delving into various subjects including the historical development of computing, data representation, computer components, algorithms, programming languages, operating systems, applications, internet and networking, and cyber-security, students will develop a well-rounded understanding of the discipline. By examining the evolution of computer science over time, students will acquire a broad perspective on the field and its significance in contemporary society. Through a combination of theoretical knowledge and practical applications, this module equips students with the necessary foundation to pursue further studies or careers in computer science.			

5

Code	Course/Module Title	ECTS	Semester
ENG-106	Engineering Workshops	5	1
Lectures (hr/w)	Lab./Prac./Tutor(hr/w)	SSWL (hr/sem)	USSWL (hr/sem)
3	2	73	52
Description			
The engineering workshops course focuses on identifying risks in the work environment and industrial safety guidelines. And training on how to measure and determine, and the use of filing tools and their work. Learn about the types of wood used in carpentry, the process of shaping it, and the use of carpentry tools and machines. Training in welding work, its types, and the process of joining metals by welding. Training on various casting works and training on mechanical operation, which includes turning, milling, and grinding. Training on pipe knowledge, how to connect, sanitary engineering works, and training on the basics of electrical workshops.			

6

Code	Course/Module Title	ECTS	Semester
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UOT-002	English Language I	2	1
Lectures (hr/w)	Lab./Prac./Tutor(hr/w)	SSWL (hr/sem)	USSWL (hr/sem)
2		31	19
Description			
This course is designed to provide engineering students with the necessary oral and written skills required for effective communication in academic and workplace contexts, both with experts in their field and lay persons. It begins by introducing them to the principles of good academic practice, which are also presented as a model for ethical workplace practice, and thus help them to avoid issues such as plagiarism. The main part then leads on to developing research and summarizing skills that form the basis for the later activities. Students next learn to apply these skills to conducting technical presentations, as well as in group discussions that culminate in project planning activities.			

7

Code	Course/Module Title	ECTS	Semester
UOT-004	Democracy and Human Rights	2	1
Lectures (hr/w)	Lab./Prac./Tutor(hr/w)	SSWL (hr/sem)	USSWL (hr/sem)
2		31	19
Description			
حقوق الانسان: هي حقوق يتمتع بها جميع مكونات البشر لمجرد اننا من ابناء البشر، وهذه الحقوق متصلة في جميع البشر مهما كان عرقهم او جنسهم او قوميتهم او مذهبهم ولا تمنح من أي دولة، وتتضمن حقوق الانسان والطفل في الحضارات القديمة والاسلام، المواثيق الدولية، مصادر وضمانات حقوق الانسان، القوانين والدساتير، مجلس حقوق الانسان، العولمة، التقدم التكنولوجي واثره على حقوق الانسان. الديمقراطية: يرجع مصطلح الديمقراطية الى الحضارة اليونانية القديمة وهي عبارة عن مصطلح مكون من مقطعين هما: (Cratia) التي تعني حكم و (Demo) التي تعني الشعب ليصبح المفهوم حكم الشعب، وتتضمن الديمقراطية التطرق الى مفهومها ومعرفة الجذور التاريخية لها، المكونات، الخصائص، المميزات، الضمانات، علاقة الديمقراطية ب (الدستور، مؤسسات المجتمع المدني، حقوق الانسان، الحكم الرشيد، الانتخابات)، الديمقراطية المعاصرة.			

8

Code	Course/Module Title	ECTS	Semester
MATH-102	Calculus II	6	2

Lectures (hr/w)	Lab./Prac./Tutor(hr/w)	SSWL (hr/sem)	USSWL (hr/sem)
4	2	87	63
Description			
This course is based on the principles of Euclidean, plane, and solid geometries. Students will be introduced to the basic postulates and theorems of geometry and encouraged to extend these ideas to the topics of similarity, circles, area, volume, and proof. In addition, students are involved in a more technological, theoretical, and algebraic approach to geometry.			

9

Code	Course/Module Title	ECTS	Semester
SE_ENG-102	Engineering Mechanics	4	2
Lectures (hr/w)	Lab./Prac./Tutor.	SSWL (hr/sem)	USSWL (hr/w)
3	1	59	41
Description			
The course covers the following topics; statics of particles: forces in plane, forces in space, equilibrium, moment of a force, moment of a couple, equivalent systems of forces on rigid bodies, equilibrium in two dimensions, equilibrium in three dimensions, distributed forces: centroids and center of gravity, analysis of structures: trusses, frames and machines, internal forces in beams and cables, friction, moments of inertia of areas, moments of inertia of masses.			

10

Code	Course/Module Title	ECTS	Semester
SE_ENG-104	Basics of Electricity	5	2
Lectures (hr/w)	Lab./Prac./Tutor.	SSWL (hr/sem)	USSWL (hr/w)
2	3	73	52
Description			
The electrical engineering course focus on basic electrical elements and fundamentals of electrical quantities such as voltage, current, resistor and electrical power then to series, parallel and how to analyze the electrical circuits in Mesh, Nodal for DC and AC circuits as well as bridge circuits then move to Alternating current AC circuits and students will able to get knowledge to time dependent signals, average and RMS values. Capacitance and inductance. Elements in series and parallel. Kirchhoff's laws and Ohm's law. , Introduction to Mesh, Nodal analysis, and superposition, Thevenin, Norton and maximum power transfer theorems for AC circuits.			

11

Code	Course/Module Title	ECTS	Semester
SE_ENG-205	Environment Pollution	5	2
Lectures (hr/w)	Lab./ <u>Prac.</u> /Tutor.	SSWL (hr/sem)	USSWL (hr/w)
2	3	73	52
Description			
This module offers a comprehensive foundation in environmental pollution, covering its nature, sources, and devastating impacts on natural ecosystems and human health. It focuses on the key aspects of air, water, and soil pollution, alongside thermal and sensory pollutants. The course emphasizes the crucial role of sustainable development and green energy in mitigating environmental degradation, while developing students' practical skills in environmental sampling and laboratory analysis.			

12

Code	Course/Module Title	ECTS	Semester
ENG-101	Engineering Drawing	3	2
Lectures (hr/w)	Lab./ <u>Prac.</u> /Tutor.	SSWL (hr/sem)	USSWL (hr/w)
1	2	45	30
Description			
An engineering drawing course focuses on usage of drawing instruments, lettering, construction of geometric shapes, etc. Students study use of dimensioning, shapes and angles or views of such drawings. Dimensions feature prominently, with focus on interpretation, importance and accurate reflection of dimensions in engineering drawing. Other areas of study in this course may include projected views and development of surfaces.			

13

Code	Course/Module Title	ECTS	Semester
SE_ENG-105	Chemistry	5	2
Lectures (hr/w)	Lab./ <u>Prac.</u> /Tutor.	SSWL (hr/sem)	USSWL (hr/w)
2	3	73	52
Description			
This course aims to establish fundamental knowledge of This subject covers techniques to understand the significance of chemistry and classification the material to physical and chemical properties. Understanding atomic structure and electron configuration, chemical bonding and molecular geometry. applying gas laws and the principles of thermodynamics.			

Analyzing chemical equilibrium and reaction kinetics. Understanding the basic concepts of hydrocarbons and their reactions.

14

Code	Course/Module Title	ECTS	Semester
UOT-001	Arabic Language I	2	2
Lectures (hr/w)	Lab./Prac./Tutor.	SSWL (hr/sem)	USSWL (hr/w)
2		31	19
Description			
تهدف هذه المادة إلى تعريف الطلبة باللغة العربية بوصفها لسان العرب، ولغة سامية حية تميزت بنظام صوتي وصرفي ونحوي وتركيبى دقيق، وهي اللغة التي نزل بها القرآن الكريم ولا يفهم على وجهه الصحيح إلا من خلالها. ويركز المقرر على تنمية مهارات الطلبة الأساسية في القراءة السليمة، والكتابة الصحيحة، وضبط قواعد الإملاء وعلامات الترقيم، إلى جانب التذوق الأدبي للنصوص القرآنية والشعرية المختارة من التراث القديم والحديث. كما يسعى المقرر إلى ربط الطالب بهويته اللغوية والثقافية، وتمكينه من توظيف العربية في حياته الجامعية والمهنية على نحو فعال.			

Degree Program Catalogue

Republic of Iraq - Ministry of Higher Education and Scientific Research Tikrit University Bachelor's degree In Sustainable Energy Engineering (First cycle) Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25hr Program Curriculum (2025 - 2026)						جمهورية العراق - وزارة التعليم العالي والبحث العلمي جامعة تكريت بكالوريوس في هندسة الطاقة المستدامة (الدورة الأولى) أربع سنوات (ثمانية فصول دراسية) - كل وحدة اوروبية = ٢٥ ساعة المنهاج الدراسي للعام ٢٠٢٦-٢٠٢٥															
Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam	SSWL	USSW	SWL	ECTS	Module Type	Prerequisite Module(s) Code		
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	hr/sem	hr/se m	hr/se m	hr/se m					
UGI	One	1	SE-ENG-101	introduction to Sustainable Energy	مقدمة في هندسة الطاقة المستدامة	English	3	2				1		3	87	63	150	6.00	C		
		2	MATH-101	Calculus I	رياضيات 1	English	4	2						3	87	63	150	6.00	B		
		3	SE-ENG-102	Physics	فيزياء	English	3		2		1			3	87	63	150	6.00	B		
		4	UOT003	Computer Sciences	علوم الحاسوب	English	1		2					3	45	30	75	3.00	S		
		5	ENG-106	Engineering Workshops	ورش هندسية	English	2		3					3	73	52	125	5.00	B		
		6	UOT002	English Language I	اللغة الانكليزية 1	English	2							3	31	19	50	2.00	S		
		7	UOT004	Democracy and Human Rights	ديموقراطية وحقوق انسان	Arabic	2							3	31	19	50	2.00	S		
				Elective	Geography of Renewable Energy Sources																
					Total		17	4	7	0	2	0	21	441	309	750	30.00				
	Two	1	MATH-102	Calculus II	رياضيات 2	English	4	2						3	87	63	150	6.00	B	MATH-101	
		2	ENG-102	Engineering Mechanics	ميكانيك هندسي	English	3				1			3	59	41	100	4.00	C		
		3	SE-ENG-104	Basics of Electricity	مبادئ الكهرباء	English	2		2		1			3	73	52	125	5.00	C		
		4	SE-ENG-205	Environment Pollution	تلوث بيئي	English	2	1	2					3	73	52	125	5.00	C	ENG-104	
		5	ENG-101	Engineering Drawing	رسم هندسي	English	1		2					3	45	30	75	3.00	C		
		6	SE-ENG-105	Chemistry	كيمياء	English	2		2		1			3	73	52	125	5.00	B		
		7	UOT001	Arabic Language I	اللغة العربية 1	Arabic	2							3	31	19	50	2.00	S		
					Total		17	3	8	0	3	0	21	337	238	575	30.00				
UGII	Three	1	SE-ENG-201	Fluid Mechanics	ميكانيك الموائع	English	2		2		1			3	73	52	125	5.00	C	MATH-101, MATH-102	
		2	SE-ENG-202	Thrmodynamic I	ديناميك الحرارة 1	English	2		2		1			3	73	52	125	5.00	C		
		3	SE-ENG-210	Heat Transfer I	انتقال حرارة 1	English	2		2		1			3	73	52	125	5.00	C		
		4	MATH-201	Engineering Analysis I	تحليلات هندسية 1	English	4	2						3	87	63	150	6.00	B	MATH-101, MATH-102	
		5	SE-ENG-204	Engineering Materials	مواد هندسية	English	2		2					3	59	41	100	4.00	C		
		6	ENG-105	Computer Programming	برمجة الحاسوب	English	1		2					3	45	30	75	3.00	S		
		7	UOT0011	Arabic Language II	اللغة العربية 2	Arabic	2							3	31	19	50	2.00	S		
				Elective	Mass Transfer																
				Total		15	2	10	0	3	0	21	410	309	750	30.00					
	Four	1	SE-ENG-207	Thermodynamic II	ديناميك الحرارة 2	English	2	1	2		1			3	87	63	150	6.00	C	SE-ENG-202	
		2	SE-ENG-208	Strength of Materials	مقاومة مواد	English	2		2		1			3	73	52	125	5.00	C	SE-ENG-102	
		3	SE-ENG-209	Economic Energy Management	ادارة اقتصاد الطاقة واخلاقيات	English	2	1			1			3	59	41	100	4.00	C		
		4	SE-ENG-317	Heat Transfer II	انتقال حرارة 2	English	2		2		1			3	73	52	125	5.00	C	SE-ENG-202, SE-ENG-207	
		5	MATH-202	Engineering Analysis II	تحليلات هندسية 2	English	4	2						3	87	63	150	6.00	B	MATH-201, MATH-101, MATH-102	
		6	UOT-021	English Language II	اللغة الانكليزية 2	English	2							3	31	19	50	2.00	S		
		7	UOT-109	Crimes of Al Bath Regime	جرائم نظام البعث	Arabic	2							3	31	19	50	2.00	S		
					Total		16	4	6	0	4	0	21	441	309	750	30.00				
UGIII	Five	1	SE-ENG-316	Thermal Solar Energy Systems	نظمة الطاقة الحرارية الشمسية	English	2	1	2		1			3	87	63	150	6.00	C	SE-ENG-210, SE-ENG-317	
		2	MATH-301	Numerical Methods	طرق عددية	English	3		1					3	59	41	100	4.00	C	MATH-202	
		3	SE-ENG-326	Photovoltaic Energy Systems	نظمة الطاقة الكهروضوئية	English	2		2		1			3	73	52	125	5.00	C		
		4	SE-ENG-311	Power Plant	محطات القدرة	English	3				1			3	59	41	100	4.00	C		
		5	SE-ENG-203	Applied Electronics	الاكترونيات التطبيقية	English	3		2		1			3	87	63	150	6.00	C		
		6	SE-ENG-313	Electric Machine	مكان كهربية	English	2		2		1			3	73	52	125	5.00	B		
					Total		15	1	9	0	5	0	18	438	312	750	30.00				
	Six	1	SE-ENG-301	Turbomachinery	المكان التوربينية	English	3		2		1			3	87	63	150	6.00	C		
		2	SE-ENG-302	Principles of Compustion and Energy Storage Systems	اساسيات الاحترافي والانبعثات	English	2	1	2		1			3	87	63	150	6.00	C		
		3	SE-ENG-303	Energy Storage Systems	النظمة تخزين الطاقة	English	3	1			1			3	73	52	125	5.00	C		
		4	SE-ENG-304	Computer Engineering Design	التصميم الهندسي بالحاسوب	English	2		2					3	59	41	100	4.00	C		
		5	SE-ENG-305	Geothermal Energy	طاقة باطن الارض	English	2		2		1			3	73	52	125	5.00	C		
		6	MATH-302	Engineering Statistics	الاحصاء الهندسي	English	2	1			1			3	59	41	100	4.00	B		
					Elective	Green Building Rating Systems															
				Total		14	3	8	0	5	0	18	438	312	750	30.00					
	UGIV	Seven	1	SE-ENG-401	Optimization	امثلية	English	2	1			1			3	59	41	100	4.00	C	
			2	SE-ENG-402	Principle of Fuel Cell Technology	مبادئ وتقنيات خلايا الوقود	English	2	1	2		1			3	87	63	150	6.00	C	
3			SE-ENG-403	Design of Sustainable Energy	تصميم انظمة الطاقة المستدامة	English	3	1			1			3	73	52	125	5.00	C		
4			SE-ENG-404	Mechanical Vibration	الاهتزازات الميكانيكية	English	3		2		1			3	87	63	150	6.00	C		
5			SE-ENG-405	Automatic Control Systems	انظمة التحكم الالي	English	3		2		1			3	87	63	150	6.00	C	MATH-201	
6			ENG-401	Graduation Project I	مشروع التخرج 1	English	1				2			3	44	31	75	3.00	C		
					Elective	Principals of Computational Fluid Dynamics															
				Elective	Hybrid Solar Thermal Systems																
				Total		14	3	6	2	5	0	18	437	313	750	30.0					
Eight		1	SE-ENG-406	Sustainable Building Design	تصميم المباني المستدامة	English	2	1			1			3	59	41	100	4.00	C	SE-ENG-301	
		2	SE-ENG-407	Wind Energy Systems	نظمة طاقة الرياح	English	2	1	2		1			3	87	63	150	6.00	C		
		3	SE-ENG-408	Biomass Energy Systems	نظمة الطاقة الحيوية	English	2	1	2		1			3	87	63	150	6.00	C		
		4	SE-ENG-409	Intelegant Network Systems	النظمة الشبكة الذكية	English	2	1	2		1			3	87	63	150	6.00	C		
		5	SE-ENG-410	Principles of Air Conditioning and the refrigeration cycle	مبادئ تكييف الهواء والتثليج	English	2		2					3	59	41	100	4.00	C		
		6	ENG-402	Graduation Project II	مشروع تخرج 2	English	1				2			3	44	31	75	3.00	C		
					Elective	Solar Drying Technology															
				Total		11	4	8	2	4	0	18	423	327	750	30.0					
Total							119	24	62	4	31	0	156	3365	2429	5825	240.0	Must be 240 ECTS			
Note: The student should complete 4 weeks of Summer Internships to fulfil the requirements of the Bachelor's degree																					
Structured SWL (hr/w) type	CL	Class Lecture				Module type	B	Basic learning activities				SWL: Student Workload									
	Lab	Laboratory					C	Core learning activity					SSWL: Structured SWL								
	Pr	Practical Training					S	Support or related learning activity					USSWL: Unstructured SWL								
	Tut	Tutorial					E	Elective learning activity													
	Lect Sem	Online lecture Seminar																			
Note: Columns O, Q and R are programmed, protected and should not be edited																					

	Ministry of Higher Education and Scientific Research - Iraq University of Tikrit College of Engineering Department of Sustainable Energy Engineering	
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MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	INTRODUCTION TO SUSTAINABLE ENERGY ENGINEERING			Module Delivery	
Module Type	CORE			Theory Lecture Tutorial Project	
Module Code	SE-ENG-102				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UGI	Semester (s) offered		1
Administering Department		Sustainable Energy Engineering Dept	College	Engineering	
Module Leader	Prof , Dr. Manar Salih Mahdi		e-mail	m.aljethelah@tu.edu.iq	
Module Leader's Acad. Title			Module Leader's Qualification		Ph.D.
Module Tutor	Asst Prof , Dr. Hussam Sami Dheyab		e-mail	hussam.sami@tu.edu.iq	
Peer Reviewer Name		Dr. Manar Salih Mahdi	e-mail	m.aljethelah@tu.edu.iq	
Review Committee Approval		09/09/2025	Version Number		1.0

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description			
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	The aim of this module is to 1- Develop students' understanding about the basic principles of energy and sustainability. 2- Identify different energy sources, including fossil fuels and renewable energy, such as solar, wind, and geothermal energy. 3- Analyze the environmental, economic, and social impacts of energy production and consumption. 4- Enhance the awareness of the importance of sustainable practices in the use of energy resources to preserve the environment. 5- Develop the skills and knowledge necessary to engage in energy management, environmental consulting, and sustainability-related policymaking.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, the students will be able to: 1. Understand the importance of sustainable energy and its forms. 2. Demonstrate knowledge principles of thermal, hydraulic, and electrical systems. 3. Gain knowledge of energy conversion technologies, energy management systems, energy storage, and energy conservation principles. 4. Solve problems including energy balances of thermal and hydraulic systems and energy storage.		
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Energy basic concepts • Thermodynamics • Heat Transfer • Fuels and Combustion • Solar energy • Wind energy • Hydro Energy • Geothermal energy • Biofuels and Biomass Energy • Energy Storage		
Course Description	This course will cover a range of energy sources and systems. The students will be introduced to some energy basics. The course also includes different energy sources and techniques, such as thermal and electrical solar energy systems, fuels and combustion, hydropower resources and turbines, wind energy, biofuels and biomass energy, and geothermal energy. The course also introduces energy storage		
Learning and Teaching Strategies			
استراتيجيات التعلم والتعليم			

Strategies	The learning and teaching strategy is designed to introduce energy systems through theory with work examples carried out by the students. This strategy is carefully delivered through lectures including question and answer sessions, demonstrating captured content, problem-solving, tutorial classes, and project methods with the students conducting a coursework assignment.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل In class lectures 42 In class tests 3 Online 28 Tutorial 14	87	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل Library, dorm, home memorizing 27 Preparation for tests 26 Homework 10	63	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		(No.)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (10)	2, 15	LO #1, 2, 3, and 4
	Onsite Assignments	2	10% (5)	5, 9	LO # 2, 3, and 4
	Online Assignments	1	5% (5)	4	LO # 1, 2, and 3
	Project	1	5% (5)	12	LO # 4
Summative assessment	Midterm Exam	1	10% (10)	7	LO #1, 2, 3, and 4
	Final Exam	1	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Introduction and Basic Concepts - Definitions and IS Units - Properties of a System

	- Processes and Cycles
Week 2	Energy, Energy Transfer, and General Energy Analysis - Forms of energy - Energy Transfer by Heat - Energy Transfer by Work
Week 3	The First Law of Thermodynamics
Week 4	Second Law of Thermodynamics
Week 5	Heat Transfer - Conduction - Convection - Radiation
Week 6	Fuels and Combustion
Week 7	Midterm exam
Week 8	Solar Energy: Basics and collectors
Week 9	Solar Energy: Photovoltaic
Week 10	Wind Energy: Basics and wind turbines
Week 11	Hydro Energy: Basics and hydro-turbines
Week 12	Hydro Energy Turbines design basics
Week 13	Geothermal Energy
Week 14	Biofuels and Biomass Energy
Week 15	Energy Storage
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	- Ibrahim Dincer, Azzam Abu-Rayash, Energy Sustainability, Elsevier (2019)	Yes
Recommended Texts	- Fundamentals and Applications of Renewable Energy, 1st Edition, Mehmet Kanoğlu, Yunus A. Çengel, John M. Cimbala, 2020, McGraw-Hill Education	No
	- Robert Bennett Dunlap, Sustainable Energy, Second Edition (2017)	Yes
Websites	https://www.iea.org/energy-system	

APPENDIX:

GRADING SCHEME مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition

Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

	Ministry of Higher Education and Scientific Research - Iraq Tikrit University College of Engineering Department of Electrical Engineering	
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MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	CALCULUS I			Module Delivery
Module Type	BASIC			Theory Lecture Tutorial Practical Seminar
Module Code	MATH-101			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level		UGI	Semester (s) offered	1
Administering Department		Sustainable Energy Engineering	College	Engineering

Module Leader	Dr. Hamza R. Yaseen	e-mail	hamza.r.yaseen94@tu.edu.iq
Module Leader's Acad. Title		Module Leader's Qualification	Ph.D.
Module Tutor	Dr.Mohanad lateef Hamada	e-mail	muhanad-lateef@tu.edu.iq
Peer Reviewer Name		e-mail	
Review Committee Approval		Version Number	1.0

Relation with Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description			
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	Developing of student ability in the general mathematics principle and applications.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1) Ability to identify, formulates, and solves engineering problems. 2) Represent functions using power series 3) Evaluate the behaviors and graphs of functions 4) Apply integrals to geometric application, physical application, and modeling problems 5) Use basic integration techniques to calculate area.		
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Review of differentiation and integration (6hrs) - Trigonometric Functions (10hrs) - The Natural Logarithm and Exponential Function (15hrs) - Methods of Integration (26hrs) - Hyperbolic Function (15hrs) - Power Series (15hrs)		
Course Description	This course is based on the principles of Euclidean, plane, and solid geometries. Students will be introduced to the basic postulates and theorems of geometry and encouraged to extend these ideas to the topics of similarity, circles, area, volume, and proof. In addition, students are involved in a more technological, theoretical, and algebraic approach to geometry.		
Learning and Teaching Strategies			
استراتيجيات التعلم والتعليم			
Strategies	The learning and teaching strategy is designed to: We designed teaching strategies to support students’ development of		

	mathematical knowledge and problem solving as well as communication and team working skills. We used an action research perspective as various methods within this stance can ensure flexibility in responding to the dynamics of interaction between the teachers and the students.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل In class lectures 84 In class tests 3	87	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل Library, dorm, home memorizing 20 Preparation for tests 10 Preparation for quizzes 10 Homework 12 Daily work 11	63	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (5)	4,8,12	LO #1, 2, 3, and 4
	Online Assignments	5	10% (2)	3, 5, 9, 11, 12	LO # 1, 2, 3, 4, and 5
	Projects	1	7% (7)	13	LO #1, 2, 3, and 4
	Onsite Assignment	4	8%(2)	3,6 , 10,11	LO # 1, 2, 3, 4, and 5
Summative assessment	Midterm Exam	1	10% (10)	7	LO # 1-3
	Final Exam	1	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Review of differentiation and integration

Week 2	Transcendental Functions: Inverse – Trigonometric Functions and The Derivatives of the Inverse – Trigonometric Functions
Week 3	The Natural Logarithm and its Derivative, and its properties
Week 4	The Natural Logarithm and its Derivative, and its properties
Week 5	The Exponential Function
Week 6	Methods of Integration: By parts
Week 7	Products of Powers of Trigonometric functions
Week 8	Even powers of Sine and Cosine
Week 9	Trigonometric substitutions that replace $a^2 - u^2$, $a^2 + u^2$ and $u^2 - a^2$
Week 10	Hyperbolic Function: Definition of Hyperbolic Function
Week 11	Derivatives and Integrals of Hyperbolic Function
Week 12	Inverse of Hyperbolic Function
Week 13	Power Series: Taylor Polynomials
Week 14	Taylor's Series for Sine, Cosine and e^x
Week 15	Binomial Theorem
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	"Calculus" by George B. Thomas, Jr. publishing company, 2010	Yes
Recommended Texts	"Engineering Mathematics" by K. A. Stroud, Dexter J. Booth, 5th edition, Industrial press Inc., New York, 2001. Advanced_Engineering_Mathematics_By_Erwin_Kreyszig_tenth_Edition, 2011 Higher Engineering Mathematics by JOHN, 2010	No
Websites		

APPENDIX:

GRADING SCHEME				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

	Ministry of Higher Education and Scientific Research - Iraq University of Tikrit College of Engineering Department of Sustainable Energy Engineering	
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MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	PHYSICS			Module Delivery	
Module Type	SUPPLEMENT			Theory Lecture Lab Tutorial Practical Seminar	
Module Code	SE-ENG-102				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		1	Semester (s) offered		1
Administering Department		Sustainable Energy Engineering	College	Engineering	
Module Leader	Prof. Dr. Tadahmun Ahmed Yassen		e-mail	tadahmunahmed@tu.edu.iq	
Module Leader's Acad. Title		Professor	Module Leader's Qualification		Ph.D.
Module Tutor	None		e-mail	None	
Peer Reviewer Name		Ass. Lec. Arjan Musadaq Taha	e-mail	arjan.m.taha@tu.edu.iq	
Review Committee Approval		22/09/2025	Version Number		1.0

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	This course aims to provide students with a strong foundation in the fundamental principles of physics, focusing on mechanics, energy, motion, fluids, and basic electrical and electronic concepts. It prepares students to apply these physical laws to engineering problems related to sustainable energy systems.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify and define the basic physical quantities and their units. 2. Explain laws of motion, energy conservation, and electricity. 3. Describe the structure of matter and behavior of fluids. 4. Interpret relationships between electrical and mechanical quantities. 5. Analyze motion and forces using Newton's laws. 6. Apply energy and momentum conservation principles to engineering problems. 7. Solve practical physics problems with analytical reasoning. 8. Perform experimental measurements and analyze data. 9. Use laboratory instruments safely and accurately. 10. Interpret experimental results in line with physical theory. 11. Communicate technical concepts effectively. 12. Work collaboratively in teams. 13. Apply scientific reasoning to real-world engineering challenges.		
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Mechanics Principles Basic Quantities, including: [5 hrs] - State SI units, and write the units and their abbreviations correctly. - - - Determine whether a physical quantity is a vector or a scalar. Distinguish between kinematic and kinetic energy. Define, calculate, and distinguish between distance and displacement, average and instantaneous speed and velocity, and average and instantaneous acceleration. Newton's three laws and its applications: [5 hrs] - State, explain, and apply Newton's three laws of motion. - - Differentiate between static and kinetic friction, and solve friction problems. State and apply Hooke's law for ideal springs. Work, energy and power: [10 hrs] - Define work, and calculate the work done by a constant force in one and two dimensions. - - - State the work-energy theorem, and use it to solve problems. Apply the principle of conservation of mechanical energy to solve simple problems in mechanics. Calculate both kinetic and potential energy. Calculate the power. Momentum and impulse: [5 hrs] - Define linear momentum, and calculate and compare momenta of various objects. Indicative Contents - - Express Newton's laws in terms of rates of change of linear momentum. Define and calculate impulse. The simple harmonic motion: [4 hrs]		

	- Part B - Electrical Principles Atomic and its structure: [10 hrs] State, explain, and apply the simple harmonic motion. Universal gravitational force: [6 hrs] - Solve problems using Newton's law of universal gravitation and calculate the gravitation for different locations (i.e. Earth, Moon, Sun and etc.). Fluid Mechanics: [20 hrs] - Calculate the pressure and density of fluid at different depth; - - - - Explain the Hydrostatic Pressure; Explain Pascal's principle and the operation of a hydraulic lift; Define and describe the buoyant forces and Archimedes's principle, furthermore, weighing an object immersed in a fluid; Derive the equation of continuity for fluids; Use Bernoulli's equation to calculate flow speed and pressure of a moving fluid for simple situations. be the Bohr model of an atom. - Define electron, proton, neutron and nucleus. - Explain electron shells and orbits. - Explain and calculate the energy levels. - Define valence electron, free electron and ions. Semiconductor's materials: [5 hrs] - Explain insulators, conductors, and semiconductors and how they differ. - Define valence band and conduction band, and compare between the semiconductor atom and the conductor atom. Diodes and Transistors: [8 hrs] - Explain the electrical symbols for a diode and diode applications. - Define the bias and its effect on the depletion region. - Define the barrier potential and its effects. - Explain the electrical symbol of a transistor, and describe the basic transistor operation. Current and Voltage: [5 hrs] - Understanding the fundamental concepts of current and voltage. - Explain the electrical circuit elements and its objects. Ohm's law and Kirchhoff's law: [7 hrs] - Define Ohm's law, and calculate power and energy - Analyze the electric circuits in both parallel and series connections. - Define Kirchhoff's law, and analysis the electrical circuits using Kirchhoff's law.
Course Description	This course covers classical mechanics (kinematics, dynamics, work, energy, momentum), fluid mechanics, gravitation, and basic electrical and electronic principles including Ohm's law, diodes, and transistors.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Interactive lectures and multimedia presentations. 2. Problem-solving sessions and tutorials. 3. Laboratory experiments and demonstrations. 4. Group discussions and assignments. 5. Continuous assessment through quizzes and lab reports.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل In class lectures 42 Tutorial 14	87	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6

Lab	28			
Final Exam	3			
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل				
Library, dorm, home memorizing	20	63	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.5
Preparation for tests	10			
Home works	13			
Design Project	10			
Reports	10			
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل		150		

Module Evaluation

تقييم المادة الدراسية

		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	All	LO #1, 2, and 3
	Assignments	15	10% (10)	All	LO # 1, 2, 3, 4, 5,6 and 7
	Homework	6	10% (10)	All	LO # 1-7
	Lab./ reports	2	10%(10)	All	LO # 8, 9, 10, 11, and 12
Summative assessment	Midterm Exam	2	10% (10)	7	LO # 1-7
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

Week	Material Covered
Week 1	Introduction to physics; Standards of length, mass and time; Scalar and Vector quantities; Kinematics; Position, Displacement and Distance; Speed, Velocity and Acceleration.
Week 2	Forces and motion; Mass and gravity force; Newton's three laws of motion.
Week 3	Spring forces and Hooke's law; Friction forces; Uniform circular motion; Work.
Week 4	Kinetic and Potential Energy; The work-kinetic energy theorem; Conservation of total mechanical energy; Power.
Week 5	Linear momentum; Momentum and kinetic energy; Rate of change of linear momentum and Newton's laws; Law of conservation of linear momentum; Impulse.
Week 6	Simple Harmonic Motion; Universal gravitation; Newton's law of universal gravitation; Free-fall acceleration and the gravitational force; and Solve problems using Newton's law of universal gravitation and calculate the gravitation for different locations.
Week 7	Midterm Exam
Week 8	Buoyant forces and Archimedes principle; the equation of continuity for fluids; and the Bernoulli's equation.
Week 9	Definition and description of the focal model of the atom and definition of the electron, proton, neutron, nucleus and explanation of the shells, electronic orbits, explanation and

	calculation of energy levels, definition of the valence electron, the free electron, ions, explanation of insulators, conductors and semiconductors and how they differ from each other, definition of the valence band, conduction band and resistance between a semiconductor atom and a conductor atom
Week 10	Explanation of diode electrical symbols and diode applications, definition of bias and its effect on the depletion region, definition of barrier voltage and its effects, explanation of the transistor electrical symbol, and description of the basic operation of the transistor.
Week 11	A comprehensive assessment of the student's level of comprehension of the grammatical and linguistic concepts covered during the first half of the course.
Week 12	Understanding the basic concepts of diode and transistor
Week 13	Understand the basic concepts of current and voltage, explain the elements of electrical circuits and their objectives (or components and functions)
Week 14	Definition of Ohm's Law, calculation of power and energy, analysis of electrical circuits in both series and parallel connections
Week 15	Definition of Kirchhoff's laws and analysis of electrical circuits using Kirchhoff's laws
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1	Balance of forces with weights
Week 4	Hooke's law Experiment
Week 8	Experiment with connecting transistors in series and parallel in electrical circuits
Week 12	Diode and transistor combination experiment in electrical circuits

	Ministry of Higher Education and Scientific Research - Iraq University of Tikrit College of Engineering Department of Mechanical Engineering	
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MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	COMPUTER SCIENCE	Module Delivery
Module Type	BASIC	☐ Theory ☐ Lecture ☐ Lab
Module Code	UOT-003	

ECTS Credits	3	Tutorial Practical Seminar	
SWL (hr/sem)	75		
Module Level	UGI	Semester (s) offered	1
Administering Department	Sustainable Energy Engineering Dept.	College	Engineering
Module Leader	Dr. Jalal N. Abdulbaqi	e-mail	Jalal.abdulbaqi@tu.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Noor saeed saleh	e-mail	noor.s.saleh@tu.edu.iq
Peer Reviewer Name		e-mail	
Review Committee Approval	14/9/2025	Version Number	1.2

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	The aim of this module is to provide students with a comprehensive understanding of the key concepts and principles of computer science. Through the study of topics such as history, data representation, computer components, algorithms, programming languages, operating systems, applications, internet and networking, and cybersecurity, students will gain a broad understanding of the field of computer science and how it has evolved over time.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe the historical development of computer science and its impact on society. 2. Understand the various methods of data representation and manipulation. 3. Identify the components of a computer and their functions. 4. Design and implement algorithms for a range of problems. 5. Understand the principles of programming languages and apply them to develop software. 6. Understand the structure and functions of operating systems. 7. Identify and analyze a range of applications of computer science. 8. Understand the principles of internet and networking technologies. 9. Identify and analyze various cybersecurity threats and methods of		

	prevention.
Indicative Contents المحتويات الإرشادية	- History introduction: Evolution of computer science, pioneers and important milestones - Data representation: Binary numbers, hexadecimal, character sets, ASCII and Unicode - Computer components: CPU, memory, input/output devices, storage devices - Algorithms: Definition, representation, complexity, searching, sorting, optimization - Programming languages: Syntax, semantics, variables, functions, control structures, abstraction - Operating systems: Structure, file systems, process management, memory management - Applications: Databases, artificial intelligence, computer graphics, human-computer interaction - Internet and networking: Protocols, network architectures, security, privacy - Cybersecurity: Threats, attacks, prevention, detection, mitigation
Course Description	This course offers students a comprehensive exploration of the fundamental concepts and principles that underpin the field of computer science. By delving into various subjects including the historical development of computing, data representation, computer components, algorithms, programming languages, operating systems, applications, internet and networking, and cyber-security, students will develop a well-rounded understanding of the discipline. By examining the evolution of computer science over time, students will acquire a broad perspective on the field and its significance in contemporary society. Through a combination of theoretical knowledge and practical applications, this module equips students with the necessary foundation to pursue further studies or careers in computer science.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module will use a range of learning and teaching strategies, including: - Lectures: To provide students with an overview of the main concepts and principles. - Labs: To provide students with hands-on experience of programming, algorithms, and data representation. - Assignments and Quizzes: To provide students with opportunities to apply their knowledge and skills to real-world problems and check their understanding.

Student Workload (SWL) الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	45	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل Library, dorm, home memorizing 15 Preparation for tests 10 Homeworks 5	30	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	15% (15)	2, 4, 6, 8, 10	LO #1, 3, 5 and 6
	Assignments	1	11% (11)	5, 14	LO # 2, 4, 7 and 8
	Lab	14	14% (14)	Continuous	
Summative assessment	Midterm Exam	1.5	10% (10)	7	LO # 1-5
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	History introduction: Evolution of computer science, pioneers and important milestones
Week 2	Data representation: Binary numbers, hexadecimal, character sets, ASCII and Unicode
Week 3	Computer components: CPU, memory, input/output devices, storage devices
Week 4	Algorithms: Definition, representation, complexity, searching, sorting, optimization
Week 5	Programming languages I
Week 6	Programming languages II
Week 7	Midterm
Week 8	Operating systems I
Week 9	Operating systems II
Week 10	Applications I: Information Systems
Week 11	Applications II: artificial intelligence
Week 12	Applications III: computer graphics, human-computer interaction
Week 13	Networking
Week 14	Internet

Week 15	Cybersecurity: Threats, attacks, prevention, detection, mitigation
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Computer Operating System (e.g. Microsoft Windows)
Week 2	Lab 2: Document Processing I (e.g. Microsoft Word)
Week 3	Lab 3: Document Processing II (e.g. Microsoft Word)
Week 4	Lab 4: Data Processing I (e.g. Microsoft Excel)
Week 5	Lab 5: Data Processing II (e.g. Microsoft Excel)
Week 6	Lab 6: Presentation Slides I (e.g. Microsoft PowerPoint)
Week 7	Lab 7: Presentation Slides II (e.g. Microsoft PowerPoint)

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Computer Science Illuminated, by Dale, N and Lewis, J, 7th Ed, Jones & Bartlett Learning, 2020	No
Recommended Texts	-	-
Websites	-	

APPENDIX:

GRADING SCHEME

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54). The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

	Ministry of Higher Education and Scientific Research - Iraq University of Tikrit College of Engineering Departments of Mechanical Engineering	
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MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	ENGINEERING WORKSHOPS			Module Delivery	
Module Type	BASIC			Theory Lecture Tutorial Practical Seminar	
Module Code	ENG-106				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UGI	Semester (s) offered		1
Administering Department		All Departments	College	Engineering	
Module Leader	Mohanad L Hamada		e-mail	muhanad-lateef@tu.edu.iq	
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification		Ph.D.
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Review Committee Approval		01/06/2023	Version Number	1.0	
Relation With Other Modules					
العلاقة مع المواد الدراسية الأخرى					
Prerequisite module	None			Semester	-
Co-requisites module	None			Semester	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description					
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر					

Module Aims أهداف المادة الدراسية	Theoretical and practical training in which the student is scientifically and technically established with the most necessary skills in the field of engineering technology
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of this course students will be able to: Knowledge of technical skills in the field of industrial safety, measurement, filing, carpentry, welding, mechanical operation, sanitary engineering and the basics of electrical work
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Industrial safety workshop(2 hours) • Measurement &Marking workshop(3 hours) • Filing workshop (10 hours) • Carpentry workshop(10 hours) • Welding workshop(10 hours) • Casting workshop(10 hours) • Machining workshop(10 hours) • plumbing workshop(10 hours) • Electrical workshop (10 hours)
Course Description	The engineering workshop course focuses on identifying risks in the work environment and industrial safety guidelines. And training on how to measure and determine, and the use of filing tools and their work. Learn about the types of wood used in carpentry, the process of shaping it, and the use of carpentry tools and machines. Training in welding work, its types, and the process of joining metals by welding. Training on various casting works and training on mechanical operation, which includes turning, milling, and grinding. Training on pipe knowledge, how to connect, sanitary engineering works, and training on the basics of electrical workshops.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategy is designed to: Carefully cover in lectures the necessary fundamental material and analytical techniques, and demonstrate concepts with appropriate (and where possible practical) examples Allow students adequate time to practice the techniques using a large number of carefully selected tutorial problems.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل			
In class lectures 70	73	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.8
In class tests 3			
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل			
Library, dorm, home memorizing 20	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
Preparation for tests 15			

Homeworks	17		
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	9	5% (5)	all	LO #1, 2, 3, and 9
	Assignments	9	15% (15)	All	LO # 1, 2, 3, 4, 5 and 9
Summative assessment	Midterm Exam	2	30% (30)	7	LO # 1-5
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Industrial safety workshop & Measurement and marking workshop
Week 2	Filing workshop
Week 3	Filing workshop
Week 4	Carpentry workshop
Week 5	Carpentry workshop
Week 6	Welding workshop
Week 7	Welding workshop
Week 8	plumbing workshop
Week 9	plumbing workshop
Week 10	Machining workshop
Week 11	Machining workshop
Week 12	Casting workshop
Week 13	Casting workshop
Week 14	Electrical workshop
Week 15	Electrical workshop
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Abd fares , Engineering workshops	Yes
Recommended Texts	Technology of Machine Tools, Steve F. Krar & J. William Oswald, McGraw-Hill Publishing Company, fourth Edition, 1991	No
Websites		

APPENDIX:**GRADING SCHEME**

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

	Ministry of Higher Education and Scientific Research - Iraq University of Tikrit College of Engineering Department of Chemical Engineering	
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MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	ENGLISH LANGUAGE I			Module Delivery	
Module Type	SUPPLEMENT			Theory Lecture Tutorial Project Seminar	
Module Code	UOT002				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		UGI	Semester (s) offered		1
Min number of students		15	Max number of students		100
Administering Department		Sustainable Energy Engineering	College	Engineering	
Module Leader	Asst. Prof. Ahmed S. Abdullah		e-mail	Ahmedsubhi1981@tu.edu.iq	
Module Leader's Acad. Title		Asst. Professor	Module Leader's Qualification		M.A.
Module Tutor	Asst. Prof. Ahmed S. Abdullah		e-mail	Ahmedsubhi1981@tu.edu.iq	
Peer Reviewer Name			e-mail		
Review Committee Approval		01/06/2023	Version Number		1.0

Relation With Other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	1,2
Co-requisites module	None	Semester	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify various reading skills and apply them in reading, referencing and summarizing literature on engineering 2. Identify various skills of technical presentation and apply them in conducting short technical presentations based on information extracted from readings 3. Identify technical discussion skills and apply these in planning and conducting simulated technical discussions characteristic of those that go on in engineering contexts. 4. Identify and compare the structures and language characteristics of various types of written study and workplace reports characteristic of those produced by engineering students and practicing engineers (e.g., incident reports and progress reports) mainly, and applying this knowledge in writing one of the latter 5. Develop communication skills through active participation in class and group activities.		
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Technical presentations (5 hrs) • Conducting technical discussions about engineering projects (5 hrs) • Writing technical documents (5 hrs) • Writing business correspondence (5 hrs)		
Course Description	This course is designed to provide engineering students with the necessary oral and written skills required for effective communication in academic and workplace contexts, both with experts in their field and lay persons. It begins by introducing them to the principles of good academic practice, which are also presented as a model for ethical workplace practice, and thus help them to avoid issues such as plagiarism. The main part then leads on to developing research and summarizing skills that form the basis for the later activities. Students next learn to apply these skills to conducting technical presentations, as well as in group discussions that culminate in project planning activities.		
Learning and Teaching Strategies استراتيجيات التعلم والتعليم			

Strategies	The learning and teaching strategy is designed to: Carefully cover in lectures the necessary fundamental material and analytical techniques, and demonstrate concepts with appropriate (and where possible practical) examples Allow students adequate time to practice the techniques using a large number of carefully selected tutorial problems.
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Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل In class lectures 26 In class tests 3 Seminars 2	31	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2.0
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل Data showing preparation 5 Preparation for tests 4 HomeWorks 6 project 4	19	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time (No)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	5, 10, 12, 14	LO #1, 2, 3, and 4
	On site assignment	1	10% (10)	2, 4, 6, 8, 10, 12	LO # 1, 2, 3, 4, 5 and 6
	Seminar	1	10% (10)	Continuous	LO # 1, 2, 3, 4, 5 and 6
	Report	1	10% (10)	7-14	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-3
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	A technical presentation. Students will perform various secondary research skills acquired to extract information of an engineering topic from different sources. They will then conduct a short technical presentation based on this information, using the presentation skills learnt
Week 2	

Week 3	
Week 4	Technical discussions and proposal writing Incorporating research results from the previous activities, students will develop a customized solution to address a context-specific problem facing a client's organization. The solution will need to be written in a recognized proposal format (e.g., a blueprint). Each student will craft one section of the document according to her/his role on the project team. Students will also plan and conduct a simulated technical team meeting with the client team to explain and discuss the solution by applying various planning and discussion skills learnt
Week 5	
Week 6	
Week 7	Midterm exam
Week 8	Conducting technical discussions about engineering projects Students will be guided to identify technical discussion skills through various types of exploratory and/or consciousness-raising activities, such as watching sample discussions and evaluating their effectiveness. They learn how to discuss with a client the customised technical design of a solution that can address a context-specific problem facing the client. They then apply these skills in conducting simulated technical team discussions, according to the roles assigned to them.
Week 9	
Week 10	
Week 11	A technical report: Each student produces a technical report by applying the knowledge gained in the related TLAs
Week 12	
Week 13	
Week 14	Writing business correspondence Students will produce a business email, based on the results of the previous activities, and by applying the textual features learnt.
Week 15	
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Beer, D. & McMurrey, D. 2004, A Guide to Writing as an Engineer (2nd ed), New York: Wiley	No
Recommended Texts	Borowick, Jerome N., 2002, Technical Communication and its Applications (2nd ed), New Jersey: Prentice-Hall, Inc.	No
Websites	http://umich.edu/~elements/5e/lectures/index.html	

APPENDIX:

GRADING SCHEME

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound works with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings

	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

	Ministry of Higher Education and Scientific Research - Iraq University of Tikrit College of Engineering Department of Environment Engineering	
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MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	DEMOCRACY AND HUMAN RIGHT (ديمقراطية وحقوق الانسان)			Module Delivery
Module Type	SUPPLEMENT			محاضرات نظرية
Module Code	UOT004			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	UGI	Semester (s) offered		
Min number of students	15	Max number of students		100
Administering Department	Sustainable energy Engineering Dept		College	Engineering
Module Leader	عبد الرحمن زيدان		e-mail	

Module Leader's Acad. Title		Module Leader's Qualification		MSc
Module Tutor	None	e-mail	None	
Peer Reviewer Name		e-mail		
Review Committee Approval		01/06/2023	Version Number	1.0

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	لا يوجد	Semester	1
Co-requisites module	لا يوجد	Semester	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	1- القدرة على ادراك المفهوم الاساسي لحقوق الانسان والطفل والديمقراطية. 2- القدرة على فهم الاصول التاريخية للمفهومين. ومعرفة ايجابيات وسلبيات حقوق الانسان والديمقراطية. 3- الاطلاع على حقوق الانسان والطفل والديمقراطية في الاسلام. 4- التعرف على مصادر حقوق الانسان والطفل وخصائص وسمات الديمقراطية. 5- معرفة اثر التطور التكنولوجي على حقوق الانسان والطفل والديمقراطية. 6- التطرق لمفاهيم ذات صلة بالمصطلحين مثل (العولمة، مؤسسات المجتمع المدني ، الانتخابات والاستفتاء ، الحكم الرشيد ، الجرائم الانسانية، الدستور). 7- الاطلاع على الضمانات التي تكفل حقوق الانسان والطفل وتكفل النظام الديمقراطي والحقوق والحريات العامة.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- التعرف على المصطلحات ذات الصلة بمفهوم حقوق الانسان والطفل والديمقراطية. 2- التعرف على اهم الحقوق التي كفلها الإسلام للإنسان والطفل واستثمارها في معالجة الآفات والحالات السلبية التي تغزو المجتمعات في العصر الحالي . 3- الاستفادة من مزايا الديمقراطية ومكوناتها في معالجة التذبذب وعدم الاستقرار في المجتمع والحفاظ على الاستقرار والسلم المجتمعي. 4- الاطلاع على المواثيق الدولية المختصة بمجالات حقوق الانسان والطفل والديمقراطية. 5- الاستفادة من تجارب الآخرين (الدول المتقدمة في مجالات حقوق الانسان والطفل والديمقراطية). 6- اللام بالقوانين والدساتير الدولية والإقليمية والمحلية المختصة بقضايا حقوق الانسان والحريات العامة والديمقراطية. 7- التعرف على جرائم الإبادة الجماعية والجرائم الإنسانية ومدى تأثيرها على مفهوم حقوق الانسان والطفل والديمقراطية.		
Indicative Contents المحتويات الإرشادية	يتضمن المحتوى الإرشادي ما يأتي: 1- حقوق الانسان والطفل والديمقراطية في الحضارات القديمة والإسلام (8 ساعات). 2- مصادر حقوق الانسان العالمية والمحلية، خصائص وسمات الديمقراطية (4 ساعات). 3- ضمانات حقوق الانسان العالمية والمحلية وضمانات النظام الديمقراطي (4 ساعات). 4- حقوق الانسان والطفل والديمقراطية واثر التقدم التكنولوجي عليهما (4 ساعات). 5- العولمة ، مؤسسات المجتمع المدني ، الانتخابات والاستفتاء ، الدستور (4 ساعات) 6- الجرائم الإنسانية وأنواعها ، الحكم الرشيد ، (2 ساعة). 7- الوثائق الدولية الخاصة بحقوق الطفل والديمقراطية المعاصرة (4 ساعات).		
Course Description			

	حقوق الانسان: هي حقوق يتمتع بها جميع مكونات البشر لمجرد اننا من ابناء البشر، وهذه الحقوق متأصلة في جميع البشر مهما كان عرقهم او جنسهم او قوميتهم او مذهبهم ولا تمنح من أي دولة، وتتضمن حقوق الانسان والطفل في الحضارات القديمة والاسلام، المواثيق الدولية، مصادر وضمانات حقوق الانسان، القوانين والدساتير، مجلس حقوق الانسان، العولمة، التقدم التكنولوجي واثره على حقوق الانسان. الديمقراطية: يرجع مصطلح الديمقراطية الى الحضارة اليونانية القديمة وهي عبارة عن مصطلح مكون من مقطعين هما: (Cratia) التي تعني حكم و (Demo) التي تعني الشعب ليصبح المفهوم حكم الشعب، وتتضمن الديمقراطية التطرق الى مفهومها ومعرفة الجذور التاريخية لها، المكونات، الخصائص، المميزات، الضمانات، علاقة الديمقراطية ب (الدستور، مؤسسات المجتمع المدني، حقوق الانسان، الحكم الرشيد، الانتخابات)، الديمقراطية المعاصرة
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	تم وضع استراتيجيات التعلم والتعليم من اجل ان يحصل الطالب على معلومات كاملة تغطي المنهج الدراسي المعد للمادة ولكي تتحقق الغاية الاساسية للمنهج الذي ينصب نحو المام وادراك الطالب بالمفاهيم الاساسية لحقوق الانسان والديمقراطية، والاطلاع على المصادر والضمانات والمواثيق الدولية للمصطلحين من اجل استثمارها في معالجة الظواهر السلبية في المجتمع والحفاظ على الاستقرار والسلم المجتمعي.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل In class lectures 28 In class tests 3	31	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.0
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل Memorizing: 10 Preparation for test : 5 Project: 4	19	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (20)	3, 5, 7, 9, 11, 13,	LO #1, 2, 3,, 11
	Assignments (Homeworks)	6	15% (15)	2, 4, 6, 10, 12, 14	LO # 1, 2, 3,, 11

	Discussions	7	5% (5)	Continuous	
Summative assessment	Midterm Exam	2	10% (10)	8	LO # 1-7
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	الجذور التاريخية لحقوق الانسان والديمقراطية في الحضارات القديمة
Week 2	حقوق الانسان والطفل والديمقراطية في الاسلام
Week 3	مصادر حقوق الانسان على المستوى الخارجي الدولي، سمات وخصائص الديمقراطية
Week 4	مصادر حقوق الانسان على المستوى الداخلي المحلي، مزايا الديمقراطية
Week 5	ضمانات حقوق الانسان على المستوى المحلي، مكونات الديمقراطية
Week 6	ضمانات حقوق الانسان على المستوى الدولي، الضمانات التي تكفل النظام الديمقراطي
Week 7	مجلس حقوق الانسان، الانتخابات واهميتها
Week 8	امتحان نصف الفصل
Week 9	التطور التكنولوجي واثره على حقوق الانسان والطفل والديمقراطية
Week 10	مفهوم العولمة، مؤسسات المجتمع المدني
Week 11	الحكم الرشيد (المبادئ، المعايير) ، الاستفتاء
Week 12	الدستور وانواعه
Week 13	حقوق الطفل في المواثيق والعهود الدولية
Week 14	الجرائم الانسانية (جرائم الابادة الجماعية) وتأثيرها على حقوق الانسان والطفل والانتظمة الديمقراطية
Week 15	الديمقراطية المعاصرة وحقوق الانسان والطفل ودراسة حالات لأمثلة واقعية حدثت في المجتمعات الدولية والعربية وفي العراق.
Week 16	امتحان نهاية الفصل

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	كتاب حقوق الانسان والديمقراطية. من تأليف: 1- ا.د. ماهر صالح علاوي الجبوري، ا.د. رياض عزيز هادي ، ا.د. رعد ناجي الجدة، ا.م.د. كامل عبد العنكود ، ا.م.د. علي عبد الرزاق محمد، ا.د. حسان محمد شفيق، (2009)	Yes

Recommended Texts	1- الديمقراطية، من تأليف : تشارلز تيلي ، ترجمة محمد فاضل طباط ، الهيئة المصرية العامة للكتاب، (2010). 2- كتاب حقوق الانسان الاساسية والدور الامني لحمايتها، المؤلف: الدكتور مبارك علوي محمد، (2019).	No
Websites	N/A	

	Ministry of Higher Education and Scientific Research - Iraq University of Tikrit College of Engineering Department of Mechanical Engineering	
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MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	CALCULUS II		Module Delivery		
Module Type	BASIC		Theory Lecture Tutorial Practical Seminar		
Module Code	MATH-102				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UGI	Semester (s) offered		2
Administering Department		mechanical Engineering	College	Engineering	
Module Leader	Dr. Hamza R. Yaseen		e-mail	hamza.r.yaseen94@tu.edu.iq	
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification		Ph.D.
Module Tutor	Dr.Israa Sami Farhan		e-mail	israa.s.farhan@tu.edu.iq	
Peer Reviewer Name			e-mail		

Review Committee Approval	01/06/2023	Version Number	1.0
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Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	Developing of student ability in the general mathematics principle and applications.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	However, based on the weekly content provided, learning outcomes for the module might be derived as follows: • Vectors and Space: Understand and apply vector operations in space, including dot and cross products. • Lines and Planes in Space: Determine equations for lines and planes in three-dimensional space. • Multivariable Functions and Partial Derivatives: Understand functions of two or more variables and find their partial derivatives using the chain rule. • Gradient and Directional Derivatives: Calculate the gradient of scalar fields and apply it to find directional derivatives. • Tangent Planes and Normal Lines: Determine equations for tangent planes and normal lines to surfaces. • Applications of Partial Derivatives: Solve optimization problems involving functions of several variables to find maxima, minima, and saddle points. • Multiple Integrals: Evaluate double and triple integrals in Cartesian, cylindrical, and spherical coordinates. • Complex Numbers and Operations: Understand and perform basic operations with complex numbers in both rectangular and polar form.		
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Vectors (30hrs) • Applications of Partial of Derivative (5hrs) • Multiple Integral (20hrs) • Complex Number (20hrs)		
Course Description	This course is based on the principles of Euclidean, plane, and solid geometries. Students will be introduced to the basic postulates and theorems of geometry and encouraged to extend these ideas to the topics of similarity, circles, area, volume, and proof. In addition, students are involved in a more technological, theoretical, and algebraic approach to		

	geometry.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategy is designed to: We designed teaching strategies to support students' development of mathematical knowledge and problem solving as well as communication and team working skills. We used an action research perspective as various methods within this stance can ensure flexibility in responding to the dynamics of interaction between the teachers and the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل In class lectures 56 Lect 28 In class tests 3	87	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل Library, dorm, home memorizing 30 Preparation for tests 10 Homeworks 14 Report 3	63	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		No.	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (5)	4,8,12	LO #1, 2, 3, and 4
	Assignment	4	12% (3)	3, 5, 9, 11, 12	LO #1, 2, 3, and 4
	Projects	1	5% (5)	13	LO #1, 2, 3, and 4
	Onsite Assignment	2	8%(4)	3,6 , 10,11	LO #1, 2, 3, and 4
Summative assessment	Midterm Exam	1	10% (10)	7	LO #1, 2, 3, and 4
	Final Exam	1	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري

	Material Covered
Week 1	Vectors: Vector in Space, Dot and Cross Products
Week 2	Equations for Lines and Planes in Space
Week 3	Function of Two and more Variables and Their Derivatives: Partial Derivatives, Chain Rules
Week 4	Partial Derivatives with Constants Variables
Week 5	Gradient and Directional Derivatives
Week 6	Tangent Plane and normal lines
Week 7	Applications of Partial of Derivative (maximum, minimum and saddle point)
Week 8	Multiple Integral: Double integral
Week 9	Double integral in polar coordinates
Week 10	Changing Cartesian integrals into Polar integrals
Week 11	Triple integral (Rectangular, Cylindrical and Spherical)
Week 12	Complex Number: Addition, Subtraction
Week 13	Multiplication and Division
Week 14	Polar representation of Complex Number
Week 15	Roots
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Calculus" by George B. Thomas, Jr. publishing company,	Yes

	2010	
Recommended Texts	“Engineering Mathematics” by K. A. Stroud, Dexter J. Booth, 5th edition, Industrial press Inc., New York, 2001. Advanced Engineering Mathematics By Erwin Kreyszig tenth Edition, 2011 Higher Engineering Mathematics by JOHN, 2010	No
Websites		

APPENDIX:

GRADING SCHEME				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

	Ministry of Higher Education and Scientific Research - Iraq University of Tikrit College of Engineering Department of Electrical Engineering	
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MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	ENGINEERING MECHANICS		Module Delivery		
Module Type	CORE		Theory Lecture Tutorial Practical Seminar		
Module Code	ENG_102				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UGI			Semester (s) offered
Min number of students		15	Max number of students		100
Administering Department		Sustainable Energy Engineering	College	Engineering	
Module Leader	Adel Mahmood Bash		e-mail	Adelbash@tu.edu.iq	
Module Leader's Acad. Title		Prof	Module Leader's Qualification		Ph.D.
Module Tutor	Dr. Hamza R. Yaseen		e-mail	hamza.r.yaseen94@tu.edu.iq	
Peer Reviewer Name			e-mail		
Review Committee Approval		01/06/2023	Version Number		1.0

Relation With Other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	1) To provide definition of force and moment vectors and give necessary vector algebra 2) To explain the concept of equilibrium of particles and rigid bodies in plane and 3D space 3) To give information about support types and to give ability to calculate support reactions 4) To explain the equilibrium of structures and internal forces in trusses, and frames 5) To give information about distributed loads 6) To explain centroid concept 7) To provide information on moment of inertia		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	6) Use both conceptual and numerical techniques to solve engineering problems. 7) Analyze and develop free-body diagrams for any system of forces in two and three dimensions. 8) Understand and use the general idea of equilibrium of a particle. 9) Understand and use the general ideas of force system resultants. 10) Determine the moment of a force about an arbitrary point and/or axes 11) Analyze the equilibrium of rigid bodies under any system of forces. 12) Analyze trusses, beams, frames, and machines. 13) Understand and use the general ideas of internal forces and draw shear and moment diagrams. 14) Calculate center of gravity, centroids, and moments of inertia. 15) Apply friction forces and analyze their different applications.		
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Force Vectors (8 hrs) - Force System Resultants (8 hrs) - Equilibrium of a Rigid Body (8 hrs) - Friction (8 hrs) - Center of Gravity and Centroid (6 hrs) - Moments of Inertia (8 hrs) - Structure and Frames (10 hrs)		
Course Description	The course covers the following topics; statics of particles: forces in plane, forces in space, equilibrium, moment of a force, moment of a couple, equivalent systems of forces on rigid bodies, equilibrium in two dimensions, equilibrium in three dimensions, distributed forces: centroids and center of gravity, analysis of structures: trusses, frames and machines, internal forces in beams and cables, friction, moments of inertia of areas, moments of inertia of masses.		

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategy is designed to: Carefully cover in lectures the necessary fundamental material and analytical techniques, and demonstrate concepts with appropriate (and where possible practical) examples Allow students adequate time to practice the techniques using a large number of carefully selected tutorial problems.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل In class lectures 50 Final test 5 Seminars 4	59	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.9
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل Library, dorm, home memorizing 20 Preparation for tests 15 Homeworks 6	41	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.73
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10, 12, 14	LO #1, 2, 3, and 4
	Assignments	5	10% (10)	2, 4, 6, 8, 10	LO # 1, 2, 3, 4, 5 and 6
	Seminars	4	8% (8)	Continuous	
	Discussions	6	12% (12)	Continuous	
Summative assessment	Midterm Exam	2	10% (10)	7	LO # 1-5
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered

Week 1	General principles, Principles of statics, vectors
Week 2	Planar forces, resultant of a force system
Week 3	Planar forces, resultant of a force system
Week 4	The free body diagram, definition of moment, moment of a couple
Week 5	The free body diagram, definition of moment, moment of a couple
Week 6	Equilibrium in 2-D, free body diagrams, equations of equilibrium
Week 7	Midterm exam
Week 8	Equilibrium in 3-D, free body diagrams, equations of equilibrium
Week 9	Structures Trusses and Frames
Week 10	Structures Trusses and Frames
Week 11	Center of mass, Gravity and centroid
Week 12	Centroids of Lines, Areas, and Volumes
Week 13	Moment of inertia
Week 14	Moments of inertia
Week 15	Friction (dry friction)
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering Mechanics-Statics, J.L.Meriam, L.G.Kraige, Wiley, 5th Edition, 2003, ISBN: 0-471-26607-8	Yes
Recommended Texts	Engineering Mechanics-Statics, Hibbeler, R.C.13th Edition, Pearson Prentice Hall, 2016, ISBN 978-0-13-31892-2."	Yes
Websites	N/A	

APPENDIX:

GRADING SCHEME

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group (0 – 49)	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:	
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NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

	Ministry of Higher Education and Scientific Research - Iraq University of Tikrit College of Engineering Departments of Engineering collage	
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MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Basic of Electricity		Module Delivery		
Module Type	Core		Theory Lecture Tutorial Practical		
Module Code	Se-ENG-104				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UGI	Semester (s) offered		2
Administering Department		Sustainable Energy	College	Engineering	
Module Leader	Ahmed Hefdhi Mohsin		e-mail	Ahmed.h.mohsin@tu.edu.iq	

Module Leader's Acad. Title	Asst. Lecturer	Module Leader's Qualification	MSC.
Module Tutor	Kahtan Ali Yousuf	e-mail	gahtan.a.yousif@tu.edu.iq
Peer Reviewer Name		e-mail	
Review Committee Approval		Version Number	1.0

Relation With Other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	1. Theoretical and practical to develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit. 3. This course deals with the basic concept of electrical circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems for DC and AC circuits. 6. To perform Mesh, Nodal analysis, and superposition , Thevenin, Norton and maximum power transfer theorems for DC and AC circuits.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of this course students will be able to: 1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Identify the basic circuit elements and their applications. 5. Describe electrical power, charge, and current. 6. Define Ohm's law and Explain the two Kirchoff's laws used in circuit analysis for DC and AC circuits and bridge networks for DC and AC circuits.		

	7. Discuss the various properties of resistors, capacitors, and inductors. 9. Solve basic electrical problems using Mesh, Nodal analysis, and superposition , Thevenin, Norton and maximum power transfer theorems for DC and AC circuits.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. , Introduction to Mesh, Nodal analysis, and superposition, Thevenin, Norton and maximum power transfer theorems for DC circuits. AC circuits – Time dependent signals, average and RMS values. Capacitance and inductance. Bridge networks for DC and AC circuits. Elements in series and parallel. Kirchhoff's laws and Ohm's law. , Introduction to Mesh, Nodal analysis, and superposition, Thevenin, Norton and maximum power transfer theorems for AC circuits.
Course Description	The electrical engineering course focus on basic electrical elements and fundamentals of electrical quantities such as voltage, current, resistor and electrical power then to series, parallel and how to analyze the electrical circuits in Mesh, Nodal for DC and AC circuits as well as bridge circuits then move to Alternating current AC circuits and students will able to get knowledge to Time dependent signals, average and RMS values. Capacitance and inductance. Elements in series and parallel. Kirchhoff's laws and Ohm's law. , Introduction to Mesh, Nodal analysis, and superposition, Thevenin, Norton and maximum power transfer theorems for AC circuits.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل In class lectures 28 Lab. 28 Tutorial 14 In class tests 3	73	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.9
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل Library, dorm, home memorizing 30 Preparation for tests 20 Homeworks 15	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

As		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	14% (14)	All	LO #1, 2, 3, and 9
	Assignments	4	16% (16)	All	LO # 1, 2, 3, 4, 5 and 9
	LAB	2	10% (10)		
Summative assessment	Midterm Exam	2	10% (10)	7	LO # 1-5
	Final Exam	2	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	Current, Voltage , Ohm's Law , Power and Energy Concepts
Week 2	DC Series, Parallel Circuits and DC Series – Parallel networks
Week 3	DC Bridge networks , Star –Delta conversions
Week 4	Methods of DC Analysis – Mesh
Week 5	Methods of DC Analysis – Nodal
Week 6	DC Network Theorem - Superposition
Week 7	DC Thevenin Theorem
Week 8	Midterm exam , DC Norton Theorem and Maximum Power Transfer Theorem
Week 9	The Basic Elements of AC Circuits and Sinusoidal Alternating Waveforms
Week 10	AC Series, Parallel Circuits and AC Series – Parallel networks
Week 11	AC Bridge networks , Star –Delta conversions
Week 12	Methods of AC Analysis – Mesh
Week 13	Methods of AC Analysis – Nodal
Week 14	AC Network Theorem - Superposition
Week 15	AC Thevenin Theorem, Norton Theorem and Maximum Power Transfer Theorem
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

Week	Material Covered
Week 1	Resistor Color Band and Ohm's Law Experiment
Week 2	DC Series, Parallel Circuits and DC Series – Parallel networks Experiment
Week 3	DC Kirchhoff's Voltage Law (KVL) and Kirchhoff's Current Law (KCL)
Week 4	DC Mesh and Nodal Experiment

Week 5	DC Superposition Theorem Experiment
Week 6	DC Thevenin Theorem Experiment
Week 7	DC Norton Theorem Experiment
Week 8	Maximum Power Transfer Theorem Experiment
Week 9	The Basic Elements of AC Circuits and Sinusoidal Alternating Waveforms Experiment
Week 10	AC Series, Parallel Circuits and DC Series – Parallel networks Experiment
Week 11	AC Mesh Experiment
Week 12	AC Superposition Theorem Experiment
Week 13	AC Thevenin Theorem Experiment
Week 14	Maximum Power Transfer Theorem Experiment
Week 15	
Week 16	Final Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Introductory circuit analysis , Robert L. Boylestad ,Pearson Publishing Company , 12nd Edition , 2022	Yes
Recommended Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
Websites		

APPENDIX:

GRADING SCHEME				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group	A – Excellent	امتياز	90 – 100	Outstanding Performance

(50 - 100)	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

	Ministry of Higher Education and Scientific Research - Iraq University of Tikrit College of Engineering Department of Sustainable Energy Engineering	
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MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	ENVIRONMENTAL POLLUTION	Module Delivery Theory Lecture Tutorial Practical Seminar Lab
Module Type	CORE	
Module Code	SE-ENG-205	
ECTS Credits	5	
SWL	125	

(hr/sem)			
Module Level	UGI	Semester (s) offered	2
Administering Department	Sustainable Energy Engineering	College	Engineering
Module Leader	Dr. Salwa H. Ahmed	e-mail	dr. salwahadi@tu.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor		e-mail	None
Peer Reviewer Name	Dr. Salwa H. Ahmed	e-mail	dr. salwahadi@tu.edu.iq
Review Committee Approval	01/10/2025	Version Number	1.0

Relation With Other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		Semester	
Co-requisites module		Semester	-

Module Aims, Learning Outcomes, Indicative Contents and Brief Description

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر

Module Aims أهداف المادة الدراسية	The primary aims of this module are: 1. To provide the essential knowledge surrounding environmental pollution and its impact on ecological systems. 2. To define and differentiate between various types and sources of pollution, including water, air, soil, thermal, noise, visual, and light pollution. 3. To explore pollution control methods, mitigation strategies, and remediation techniques across different environmental media. 4. To highlight the significance of ecological balance, sustainability, and the necessity of transitioning to renewable and green energy to curb environmental deterioration.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion of this module, the student will be able to: 1. Define the concept of ecological balance and identify the main categories of environmental pollution, including water, air, soil, and thermal pollution. 2. Classify pollutants based on their sources, impacts, and types (primary and secondary). 3. Analyze the physical and chemical characteristics of water and explain the causes and effects of various pollution forms on ecosystems and human health. 4. Describe methods for controlling and remediating water, air, and soil pollution, including relevant treatment and repair techniques.

	5. Evaluate the role of sustainable development and realize the importance of renewable and green energy sources in environmental protection. 6. Analyze the environmental impact of thermal pollution, especially concerning power plant operations, and propose strategies to mitigate various sensory pollutants (noise, light, visual).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Foundational Concepts and Pollution Introduction (10 hrs) (6 T + 4 P). 2. Water Pollution Analysis and Control (14 hrs) (6 T + 8 P). 3. Air and Soil Pollution Management (23 hrs) (15 T + 8 P) 4. Thermal, Sensory Pollution, and Sustainable Solutions (20 hrs) (12 T + 8 P) 5. Course Review and Final Assessment (8 hrs) (6 T + 2 P)
Course Description	This module offers a comprehensive foundation in environmental pollution, covering its nature, sources, and devastating impacts on natural ecosystems and human health. It focuses on the key aspects of air, water, and soil pollution, alongside thermal and sensory pollutants. The course emphasizes the crucial role of sustainable development and green energy in mitigating environmental degradation, while developing students' practical skills in environmental sampling and laboratory analysis.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	It is based on blended and interactive learning, aiming to develop students' critical thinking. Interactive theoretical lectures are combined with the analysis of real-life case studies for environmental impact assessment. This strategy is complemented by a focus on practical laboratory experiments to train students in sampling and basic pollutant analysis, ensuring they acquire the technical skills necessary to apply theoretical knowledge to solve sustainable environmental problems..

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل			
In class lectures 28 Lect. 14 Lab. 28 Final Exam 3	73	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.84
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل			
Library, dorm, home memorizing 20 Preparation for tests Home works 12 Design Project 10 Reports 10	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.16
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	2,5, 10, 12, 14	LO #1, 2, 3, and 4
	Assignments	15	10% (10)	Continuous	LO # 1, 2, 3, 4, 5,6 and 7
	Seminars	2	10% (10)	Continuous	
Summative assessment	Midterm Exam	2	10% (10)	7	LO # 1-5
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction and Basics: Ecological Balance, Definition of Environmental Pollution, Main Types of Pollution (Water, Air, Soil, Thermal)
Week 2	Sources and Classification: Major Pollution Sources, Degrees of Pollution, Classification of Pollutants (Primary and Secondary)
Week 3	Water Pollution (I): Physical and Chemical Properties of Water, Water Pollutants.
Week 4	Water Pollution (II): Types of Water Pollution, River and Groundwater Contamination, Water Pollution Control Methods.
Week 5	Air Pollution (I): Atmospheric Layers, Air Components, Sources of Air Pollution.
Week 6	Air Pollution (II): Primary and Secondary Air Pollutants, Proposed Solutions for Air Pollution Reduction.
Week 7	Pollution Control: Methods Control and Remediation Techniques for Water and Air Pollution.
Week 8	Sustainability and Green Energy Sustainable: Development, Renewable/Alternative/Green Energy, and their role in environmental reduction.
Week 9	Soil Pollution (I): Soil Composition, Causes of Soil Degradation, Sources of Soil Pollution.
Week 10	Soil Pollution (II): Handling Contaminated Lands, Agricultural Soil Pollution, Biological and Radioactive Soil Pollution.
Week 11	Thermal Pollution (I): Main Sources of Thermal Pollution, Effects, and Cooling Systems in Power Plants.
Week 12	Thermal Pollution (II): Impact of Thermal Pollution on Water Resources, Methods for Reducing Thermal Pollution.
Week 13	Sensory Pollutions: Noise Pollution, Visual Pollution, and Light Pollution.
Week 14	Case Studies and Review: Review of key concepts and discussion of major environmental case studies.
Week 15	Midterm Exam: Review week or scheduled Midterm Examination.

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي العملي

	Material Covered
Week 1-2	Lab Safety and Sampling: Lab safety protocols, introduction to environmental analysis equipment, and fundamental techniques for environmental sampling.
Week 3-4	Water Quality: Physical Parameters: Measurement of Temperature, Turbidity, and pH in water samples.
Week 5-6	Water Quality: Chemical Parameters: Determination of Dissolved Oxygen (DO) and Chemical Oxygen Demand (COD).
Week 7-8	Air Quality Analysis: Basic monitoring of airborne particulates and identification of gaseous pollutant indicators.
Week 9-10	Soil Quality Analysis: Correct soil sampling procedures and estimation of moisture and organic matter content in soil.
Week 11-12	Water Treatment Simulation: Experiment simulating primary wastewater treatment processes (e.g., coagulation and sedimentation).
Week 13-14	Thermal and Noise Measurement: Using specialized meters to measure noise levels and simulate the impact of thermal discharge.
Week 15	Final Lab Report Submission and Review: Discussion of practical findings and review of analytical techniques.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	avid A. Cornwell, Mackenzie L. Davis, Introduction to Environmental Engineering, Fifth Edition, 2012, McGraw-Hill Education.	Yes
Recommended Texts	Richard O. Mines, Environmental Engineering Principles and Practice, 2014, Wiley.	yes
Websites	-	

APPENDIX:**GRADING SCHEME**

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:				
NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				
	Ministry of Higher Education and Scientific Research - Iraq University of Tikrit College of Engineering Department of environmental Engineering			

MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	ENGINEERING DRAWING			Module Delivery	
Module Type	SUPPLEMENT			☐ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical	
Module Code	ENG-101				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level		UGI	Semester (s) offered		2
Administering Department		Sustainable Energy Engineering	College	Engineering	
Module Leader	Sabah Mohammed Hasan		e-mail		
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification		Ms.C
Module Tutor	None		e-mail	None	
Peer Reviewer Name			e-mail		
Review Committee Approval		20/09/2025	Version Number		1.0

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	-
Co-requisites module	None	Semester	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description			
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	1. Define and explain the uses of different drawing equipment. 2. Identify the different drawing equipment. 3. Layout drawing papers and prepare a title block. 4. Practically distinguish the types of dimensioning. 5. Carry out geometrical construction of different shapes. 6. Carry out isometric and orthographic drawing of objects.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of this course students will be able to: 1. Prepare and understand drawings. 2. Identify various curves used in Engineering Drawing and their applications. 3. Use the principles of orthographic projections. 4. By studying about isometric projections students will be able to visualize three-dimensional objects and that will enable them to design new products. 5. Design and fabricate surfaces of different shapes. 6. Represent the objects in three dimensional appearances		
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Introduction to Drawing Equipment (6hrs) • Geometrical Construction (12hrs) • Orthographic Projection (9hrs) • Sectional views(6hrs) • Isometric Projections(9hrs) • Dimensioning(3hrs)		
Course Description	An engineering drawing course focuses on usage of drawing instruments, lettering, construction of geometric shapes, etc. Students study use of dimensioning, shapes and angles or views of such drawings. Dimensions feature prominently, with focus on interpretation, importance and accurate reflection of dimensions in engineering drawing. Other areas of study in this course may include projected views and development of surfaces..		
Learning and Teaching Strategies			
استراتيجيات التعلم والتعليم			
Strategies	The learning and teaching strategy is designed to: Carefully cover in lectures the necessary fundamental material and analytical techniques, and demonstrate concepts with appropriate (and where possible practical) examples Allow students adequate time to practice the techniques using a large number of carefully selected tutorial problems.		

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل In class lectures 42 In class tests 3	45	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل Library, dorm, home memorizing 15 Preparation for tests 10 Homeworks 5	30	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	all	LO #1, 2, 3, and 4
	Assignments	6	30% (30)	All	LO # 1, 2, 3, 4, 5 and 6
Summative assessment	Midterm Exam	2	10% (10)	7	LO # 1-3
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to engineering drawing
Week 2	Primary elements of drawings
Week 3	Geometrical Construction
Week 4	Tangency
Week 5	Loci applications
Week 6	Tangency and loci applications
Week 7	Dimensioning
Week 8	Theory of Projection
Week 9	Orthographic Projections
Week 10	Orthographic Projections
Week 11	Sections and Sectional views
Week 12	Sections and Sectional views
Week 13	Isometric Projections
Week 14	Isometric Projections
Week 15	Isometric Projections
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Engineering Drawing, Abdul-Rassul Abdul-Hussain, University of Technology, 1986.	Yes

Recommended Texts	SIMMONS, C., MAGUIRE, D., PHELPS, N., 2021. Manual of engineering Drawing Technical product specification and Documentation to British and International Standards, 4 ed, Elsevier Ltd:Oxford REDDY, K. , 2008. Textbook of Engineering Drawing. 2ed, Adithya Art Printers:Hyderabad SHAH, M. B. , RANA, B. C. , 2007. Engineering Drawing. 2ed, Dorling Kindersley(India) Pvt. Ltd :India	No
Websites		

APPENDIX:

GRADING SCHEME مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

	Ministry of Higher Education and Scientific Research - Iraq University of Tikrit College of Engineering Department of Sustainable Energy Engineering	
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MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information معلومات المادة الدراسية
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Module Title	CHEMISTRY			Module Delivery	
Module Type	SUPPLEMENT			Theory Lecture Lab Tutorial Practical Seminar	
Module Code	SE-ENG-105				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UGI	Semester (s) offered		2
Administering Department		Sustainable Energy Engineering	College	Engineering	
Module Leader	Sabah Mohammed Hasan		e-mail	sabahmohamed@tu.edu.iq	
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification		Ph.D.
Module Tutor	Aqhwanh abd al-majeed		e-mail	ekewanh.a.almajeed@tu.edu.iq	
Peer Reviewer Name		Ass. Lec. Sabah M. Hasan	e-mail	sabahmohamed@tu.edu.iq	
Review Committee Approval		20/09/2025	Version Number		1.0

Relation With Other Modules

العلاقة مع المواد الدراسية الأخرى

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

Module Aims, Learning Outcomes, Indicative Contents and Brief Description

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر

Module Aims أهداف المادة الدراسية	Students will be able to: 1. Understanding atomic structure and electron configuration. 2. Applying knowledge of chemical bonding and molecular geometry. 3. Performing stoichiometric calculations for chemical reactions. 4. Understanding and applying gas laws and the principles of thermodynamics. 5. Analyzing chemical equilibria and reaction kinetics. 6. Exploring the properties of acids, bases, salts, and conducting titrations. 7. Understanding the basic concepts of hydrocarbons and their reactions
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. A good understanding of the scientific method. 2. A broad understanding of the fundamental concepts of chemical bonding, reactions, and practical applications. 3. The ability to recognize and understand the impact that chemistry has on

	every aspect of their lives. 4. A working knowledge of chemistry especially as it relates to the world around them. 5. The ability to read popular media and understand the significance of chemistry as it relates to the world around them. 6. Classify matter and relate its classification to physical and chemical properties. 7. Relate the properties of elements to their structure, location on the periodic table, and natural state. 8. Measure quantities in the laboratory using appropriate equipment and perform calculations preserving the precision of those measurements. 9. Identify the bonding characteristics of substances based upon their properties and elemental makeup. 10. Perform quantitative calculations to predict projected yields of reactions with regard to products, masses, and energy output or consumption. 11. Calculate specific concentration ratios and predict the dependence of reaction mechanisms (rate and direction) on relative quantities. 12. Identify acids and bases as to their properties and reactions, as well as methods to determine the concentration of acids and bases. 13. Apply theoretical ideas studied to practical situations in the laboratory. 14. Perform data collection and analysis drawing meaningful conclusions from the data as part of a cooperative group in the laboratory .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Atomic Structure, Electron Configuration, Elements – Define and describe atomic structure, including protons, neutrons, and electrons. – Explain electron configuration and its significance in determining the chemical properties of elements. – Understand and classify elements in the periodic table, including groups and periods. Ionic Bonding, Ionic Nomenclature, Covalent Bonding – Define ionic bonding and explain how ions form through the transfer of electrons. – Describe and apply the rules of ionic nomenclature to name ionic compounds. – Explain covalent bonding, including single, double, and triple bonds, and describe how atoms share electrons. Qualitative Analysis, Geometry, Polarity, Nomenclature – Understand qualitative analysis techniques for identifying ions in a solution. – Explore molecular geometry using VSEPR theory and predict the shapes of molecules. – Discuss molecular polarity and how it affects physical properties. – Apply rules of nomenclature to name covalent compounds. Calculations, Moles, Reactions – Perform chemical calculations involving moles, molar mass, and Avogadro's number. – Write and balance chemical equations for various types of reactions. – Understand and apply the concept of stoichiometry in chemical reactions.

Chemical Reactions, Stoichiometry

- Classify different types of chemical reactions, including synthesis, decomposition, single replacement, and double replacement.
- Perform stoichiometric calculations to determine the amounts of reactants and products in chemical reactions.
- Apply the concept of limiting reactants and percent yield in stoichiometric calculations.

Gases, Gas Laws, Phases

- Explore the properties of gases and the principles behind the gas laws (Boyle's, Charles', and Avogadro's laws).
- Apply the ideal gas law to solve problems involving pressure, volume, temperature, and moles.
- Understand the different phases of matter and the phase transitions between solid, liquid, and gas.

Solution Formation

- Describe the process of solution formation, including solvation and factors affecting solubility.
- Discuss the different types of solutions (solid, liquid, gas) and their properties.
- Explore the role of solutes and solvents in the formation of solutions.

Mid-Term Exam

- Review and assess understanding of the content covered in Weeks 1-7.

Concentration, Colligative Properties

- Calculate the concentration of solutions in terms of molarity, molality, and percent composition.
- Explore colligative properties such as boiling point elevation, freezing point depression, and osmotic pressure.
- Understand the impact of solute concentration on the physical properties of solutions.

Redox Reactions

- Define oxidation and reduction and identify redox reactions.
- Assign oxidation states to elements in compounds and reactions.
- Balance redox equations using the oxidation number method.

Reaction Energetics, Equilibria

- Discuss the energetics of chemical reactions, including exothermic and endothermic reactions.
- Explore the concept of chemical equilibrium and the factors that affect it.
- Understand and apply Le Châtelier's principle to predict changes in equilibrium.

Equilibrium Constant, Le Châtelier

- Define the equilibrium constant (K) and calculate it for various chemical reactions.
- Apply Le Châtelier's principle to predict the effects of changes in concentration, pressure, and temperature on equilibrium.
- Solve problems involving the calculation of equilibrium concentrations.

Acids, Bases, Salts

- Define acids, bases, and salts according to the Arrhenius, Brønsted-Lowry, and Lewis theories.

	– Explore the properties of acids and bases, including pH and pOH calculations. – Discuss the formation and properties of salts. Neutralization, Titration – Understand the process of neutralization and the formation of water and salt in acid-base reactions. – Perform titration calculations to determine the concentration of acids or bases in a solution. – Explore indicators and their role in titration experiments. Introduction to Hydrocarbons – Define and classify hydrocarbons, including alkanes, alkenes, and alkynes. – Discuss the structure, nomenclature, and properties of hydrocarbons. – Explore the basic reactions of hydrocarbons, such as combustion and addition reactions. Preparatory Week Before Final Exam – Review and consolidate understanding of the entire course content. – Prepare for the final exam with practice problems, revision sessions, and Q&A.
Course Description	This course aims to establish fundamental knowledge of This subject covers techniques to understand the significance of chemistry and classification the material to physical and chemical properties. Understanding atomic structure and electron configuration, chemical bonding and molecular geometry. applying gas laws and the principles of thermodynamics. Analyzing chemical equilibria and reaction kinetics. Understanding the basic concepts of hydrocarbons and their reactions.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary strategy for delivering this module will be to encourage students to participate in the exercises while refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving sampling activities that students find interesting.

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

Module Evaluation

تقييم المادة الدراسية

		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (10)	4,9,12	LO #1, 2, 10 and 11
	Assignments	4	10% (10)	2,12	LO # 3, 4, 6 and 7
	Report / lab	2	10% (10)		
	Project	1	10% (10)	9	LO #5 ,8 and 10
Summative assessment	Midterm Exam	1hr	10% (10)	8	LO # 1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Atomic Structure, Electron Configuration, Elements
Week 2	Ionic Bonding, Ionic Nomenclature, Covalent Bonding
Week 3	Qualitative Analysis, Geometry, Polarity, Nomenclature
Week 4	Calculations, Moles, Reactions,
Week 5	Chemical Reactions, Stoichiometry
Week 6	Gases, Gas Laws, Phases
Week 7	Solution Formation
Week 8	Mid-Term exam
Week 9	Concentration, Colligative, Properties
Week 10	Redox Reactions
Week 11	Reaction Energetics, Equilibria
Week 12	Equilibrium Constant, LeChâtelie
Week 13	Acids, Bases, Salts
Week 14	Neutralization, Titration
Week 15	ntroduction to Hydrocarbons
Week 16	Preparatory week before the final Exam

(Delivery Plan (Weekly Lab. Syllabus

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: There are no laboratory experiments.
Week 2	Lab 1: There are no laboratory experiments.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Stoker, S.H. General, Organic, and Biological Chemistry, Sixth Edition, 2010. Houghton Mifflin. Boston, Mass. 2 .Bundy, Robert, Castiglia Lab Manual for Fundamenta lChemistry I, Chemistry 101, 2014-2015 Edition	Yes
Recommended Texts		No
Websites		

GRADING SCHEME مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد معالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above

	Ministry of Higher Education and Scientific Research - Iraq University of Tikrit College of Engineering Department of Environment Engineering	
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MODULE DESCRIPTOR

وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	اللغة العربية	Module Delivery	
Module Type	غير أساسية (داعمة)	محاضرات نظرية	
Module Code	UOT001		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGI	Semester (s) offered	2
Min number of students	15	Max number of students	100
Administering Department	Chemical Engineering	College	Engineering
Module Leader	Wasna Younis Abdullah	e-mail	Wasna.y.abdullah@tu.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	MSc
Module Tutor	Ali Qais Mohammed	e-mail	Ali.aliqais8383@gmail.com
Peer Reviewer Name	Wasna Younis Abdullah	e-mail	Wasna.y.abdullah@tu.edu.iq
Review Committee Approval	9/09/2025	Version Number	3.0

Relation With Other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	لا يوجد	Semester	1
Co-requisites module	لا يوجد	Semester	-
Module Aims, Learning Outcomes, Indicative Contents and Brief Description			
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر			
Module Aims أهداف المادة الدراسية	1- تطوير المهارات اللغوية وحفظ بعض السور القرآنية وتعزيز حب اللغة لدى الطلبة. 2- فهم كيفية تطبيق القواعد اللغوية في الحياة اليومية، ومعرفة المصطلحات اللغوية في مجالات الهندسة والعلوم. 3- أهمية اللغة العربية في مجالات الحياة اليومية 4- استخدام القواعد اللغوية في كتابة التقارير والأبحاث العلمية بشكل صحيح. 5- تعزيز التعلم الذاتي والاستقلالية في التعلم وتشجيع الطلاب على أخذ مبادرة في تعلم اللغة العربية.		
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- فهم القواعد اللغوية وعلامات الترقيم وحفظ السور القرآنية. 2- تطوير المحصلة اللغوية لدى الطلبة من خلال تعلم الشعر والقواعد اللغوية بشكل صحيح. 3- تغطية معظم المواضيع اللغوية التي يحتاجها المهندس في مسيرته العملية 4- التدريب على الحفظ والنطق الصحيح لبعض السور القرآنية بالإضافة إلى التدريب على قراءة الشعر العربي وتعلم واستخدام قواعد اللغة العربية 5- الممارسات المتكررة لشرح المادة النظرية واستخدام الآلات والوسائل الحديثة بشرح المادة مع ضمان ملائمة المادة النظرية للاحتياجات الواقعية		
Indicative Contents المحتويات الإرشادية	يتضمن المحتوى الإرشادي ما يأتي: 1- من سورة البقرة الآيات من 260-263 (2 ساعة). 2- من الحديث النبوي الشريف (2 ساعة). 3- معلقة عمرو بن كلثوم (2 ساعة). 4- سبعة أبيات من بانية ابن الرومي (2 ساعة). 5- القيم الإنسانية في الشعر الجاهلي (2 ساعة). 6- الميزان الصرفي (2 ساعة). 7- تصريف الأفعال (الصحة والاعتلال) (2 ساعة).		

	8- أحكام كتابة علامات الترقيم (2 ساعة). 9- أحكام كتابة الهمزة (2 ساعة). 10- أقسام الكلام وعلامات إعرابها (2 ساعة). 11- النواسخ (2 ساعة). 12- المدارس المعجمية (2 ساعة). 13- معاني الألفاظ الغريبة في القرآن الكريم (2 ساعة). 14- علم البيان (تعريفه وأنواعه (2 ساعة).
Course Description	تهدف هذه المادة إلى تعريف الطلبة باللغة العربية بوصفها لسان العرب، ولغة سامية حيّة تميزت بنظام صوتي وصرفي ونحوي وتركيبى دقيق، وهي اللغة التي نزل بها القرآن الكريم ولا يفهم على وجهه الصحيح إلا من خلالها. ويركز المقرر على تنمية مهارات الطلبة الأساسية في القراءة السليمة، والكتابة الصحيحة، وضبط قواعد الإملاء وعلامات الترقيم، إلى جانب التدنوق الأدبي للنصوص القرآنية والشعرية المختارة من التراث القديم والحديث. كما يسعى المقرر إلى ربط الطالب بهويته اللغوية والثقافية، وتمكينه من توظيف العربية في حياته الجامعية والمهنية على نحو فعال.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	ان استراتيجية التعلم هي أسلوب تعليمي يعتمد على إعادة تنظيم المعلومات وتكييفها بطريقة تمكن من الوصول إلى معلومات جديدة، وتتميز هذه الاستراتيجية بأنها تجعل الطالب نشطاً وإيجابياً ودورنا يتمثل في دور الموجه والمرشد والمخطط وهذا يُمكن من اكتشاف المعرفة بسلاسة من قبل الطلاب.
Student Workload (SWL) الحمل الدراسي للطلاب	

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل 30In class lectures 3In class tests	31	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	19	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

As		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (20)	9,11,13, 7, 5, 3	11, 4, LO #1, 2, 3
	Assignments (Homeworks)	6	10% (10)	10,12,14, 2, 4, 6,	11, LO # 1, 2, 3, 4
	Discussions	7	5% (5)	Continuous	
	Seminar	3	5%(5)		
Summative assessment	Midterm Exam	2	10% (10)	8	7LO # 1-
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

Week	Material Covered
Week 1	سورة البقرة من الآيات 260-263

Week 2	حديث نبوي شريف
Week 3	أبيات من معلقة عمرو بن كلثوم
Week 4	سبعة أبيات من بائية ابن الرومي
Week 5	القيم الإنسانية في الشعر الجاهلي
Week 6	الميزان الصرفي
Week 7	تصريف الأفعال (الصحة والاعتلال)
Week 8	امتحان نصف الفصل
Week 9	أقسام الكلام وعلامات إعرابها
Week 10	أحكام كتابة علامات الترقيم
Week 11	أحكام كتابة الهمزة
Week 12	المدارس المعجمية
Week 13	معاني الألفاظ الغريبة في القرآن الكريم
Week 14	النواسخ
Week 15	علم البيان (تعريفه وأنواعه)
Week 16	امتحان نهاية الفصل

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	اللغة العربية لأقسام غير الاختصاص	Yes
Recommended Texts	التفسير الوسيط أ.د. وهبة الزحيلي المنهاج في القواعد والإعراب: محمد الأنطاكي	No
Websites	N/A	

APPENDIX:

GRADING SCHEME
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C – Good	جيد	70 – 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.